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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1980



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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

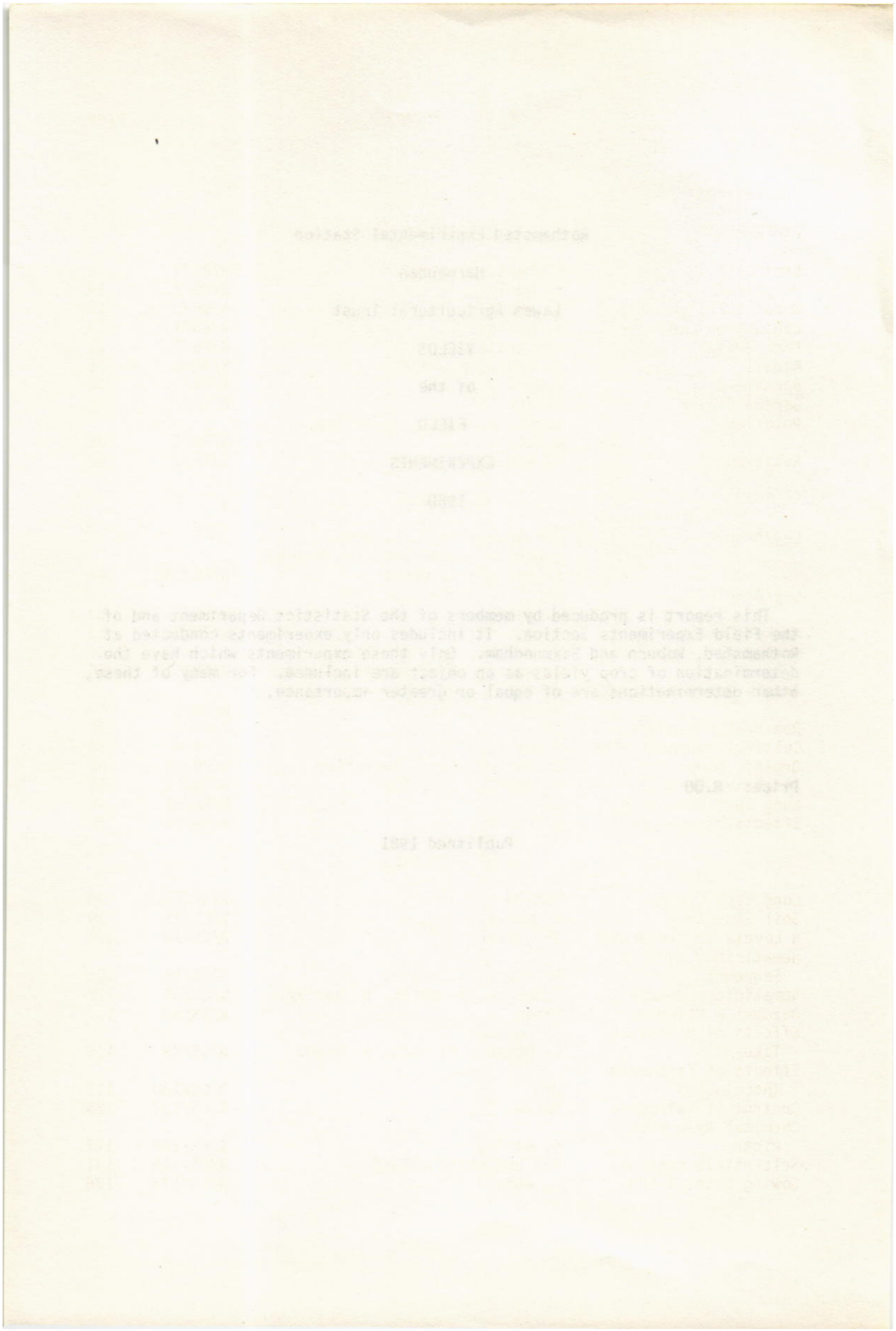
YIELDS of the FIELD EXPERIMENTS 1980

This report is produced by members of the Statistics Department and of the Field Experiments Section. It includes only experiments conducted at Rothamsted, Woburn and Saxmundham. Only those experiments which have the determination of crop yields as an object are included. For many of these, other determinations are of equal or greater importance.

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CONVERSION FACTORS

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CONVENTIONS 1980

For each experiment current treatments are shown, together with the factor and level names which are used in the tables. The program used for the analyses of these experiments limits level names to eight characters, and factor names similarly, though a suffix of up to 3 digits in brackets may be appended if required.

For each experiment, other than annuals, references are given to previous years. These refer to the '(Numerical)(Results) Yields of the Field Experiments' - (t) indicates a year when treatments were described. Since 1973 treatments have been described annually for all experiments and (t) is not used for these years.

For the classical and some long-term experiments reference is made to 'Details' - separate publications, giving full descriptions of treatments until 1967 & 1973, with full titles 'Details of the Classical and Long Term Experiments up to 1967' and 'Details of the Classical and Long Term Experiments up to 1973'.

The following conventions are observed unless otherwise stated.

All areas are in hectares. All plot dimensions are in metres.

All seed rates, rates of application of fertilisers, sprays etc. are per hectare.

All yields and plant numbers are per hectare.

The following abbreviations are used in variate headings:

Wheat, barley, oats, beans etc.

Grain:	Grain (at 85% dry matter)
Straw:	Straw (at 85% dry matter)

Sugar beet

Roots:	Roots (washed)
Sugar %:	Sugar percentage

All crops

Mean D.M. %:	Mean dry matter % as harvested

For any other crop, details of abbreviations are given as necessary.

'Nitro-Chalk' refers to the grade containing 26% N unless otherwise stated.

Compound fertilisers indicated thus - (20:10:10) = compound fertiliser (20% N, 10% P_2O_5, 10% K_2O), granular unless otherwise stated.

The compound fertiliser (13:13:20) used in our experiments is the grade containing sulphate of potash.

Treatment of cereal seed with organomercury and/or gamma HCH should be assumed in this report, exceptions are noted.

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Harvest areas for cereals

On most of those cereal experiments at Rothamsted and Woburn (but not Saxmundham) which are harvested by combine the 'blank-row' technique is used to distinguish the areas taken for yield from the discard areas. When seed is drilled in rows 7 in. (18 cm.) apart (the most common arrangement), appropriate coulters are prevented from sowing and 8 or 16 rows are left for yield according to the cutter-bar width of the combine to be used. If the row-spacing is other than 7 in. a similar arrangement is used but with a different number of rows.

The ends of plots are separated from each other or from headlands by 3 ft (91 cm.) fallow paths made after the crop has established.

The 'Area harvested' in the 'Yields', when the blank-row technique is used, is the product:-

number of rows harvested x distance between rows x length of rows.

A series of experiments at Rothamsted showed that on average the yield of 16 rows (50 ft (15 m) long) was 7.8% greater with blank rows than without. (Experimental Husbandry 23 pp 16-20 (1972)).

If no rows are left blank and the plot is wider than the combine harvester so that discards are left uncut, the 'Area harvested' is the product:-

width of cutter bar x length of rows.

If the plot is narrower than the combine so that the whole area between paths is cut, the 'Area harvested' is the product:-

number of rows x distance between rows x length of rows.

We do not apply the adjustment used by some workers who take the harvested areas as width x length where each is measured to the centre of 'paths' up to a maximum of 18 in (46 cm).

Tables of means

Tables of means are presented directly from computer output. Both factor and level names are present in upper case characters. Vertical and horizontal lines are omitted e.g.:-

FACTOR C	LEVEL C1		LEVEL C2		LEVEL C3	
FACTOR B	LEVEL B1	LEVEL B2	LEVEL B1	LEVEL B2	LEVEL B1	LEVEL B2
FACTOR A						
LEVEL A1	*	*	*	*	*	*
LEVEL A2	*	*	*	*	*	*

Standard errors

NOTES: (1) This report gives standard errors of differences, not of means.

(2) Annotations (e.g. * min rep, max-min, max rep) to S.E.Ds are only explained the first time they occur in any experiment.

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80/R/BK/1

BROADBALK

Object: To study the effects of organic and inorganic manures on continuous w. wheat. From 1968 two three-year rotations were included: potatoes, beans, wheat and fallow, wheat, wheat. In 1979 the first rotation was changed to fallow, potatoes, w. wheat.

The 137th year, w. wheat. fallow, potatoes. The 13th year of the rotations.

For previous years see 'Details' 1967 & 1973, Station Report for 1966, pp. 229-231, Station Report for 1968, Part 2, and 74-79/R/BK/1.

Areas harvested:

	Section	
Wheat:	0	0.00434
	1	0.00798
	3,4,5 & 6	0.00659
	8 & 9	0.00694
Potatoes:	2	0.00659

Treatments:

Whole plots

PLOT	Plot	Fertilisers and organic manures:- Treatments until 1967	Treatments from 1968	Changes from 1980
01DN2PK	01	-	D N2 P K	-
21DN2	21	D	D N2	-
22D	22	D	D	-
030	03	None	None	-
05F	05	P K Na Mg	P K (Na) Mg	-
06N1F	06	N1 P K Na Mg	N1 P K (Na) Mg	-
07N2F	07	N2 P K Na Mg	N2 P K (Na) Mg	-
08N3F	08	N3 P K Na Mg	N3 P K (Na) Mg	-
09N4F	09	N*1 P K Na Mg	N4 P K (Na) Mg	-
10N2	10	N2	N2	-
11N2P	11	N2 P	N2 P	-
12N2PNA	12	N2 P Na	N2 P Na	-
13N2PK	13	N2 P K	N2 P K	-
14N2PKMG	14	N2 P Mg	N2 P K Mg	-
15N3F	15	N2 P K Na Mg	N3 P K (Na) Mg	-
16N2F	16	N*2 P K Na Mg	N2 P K (Na) Mg	-
17N1+3FH	17	N2(A)	N2 1/2(P K (Na) Mg)	N1+3 1/2(PK (Na) Mg)+
18N0+3FH	18	P K Na Mg(A)	N2 1/2(P K (Na) Mg)	N0+3 1/2(PK (Na) Mg)+
19C	19	C	C	-
20NKMG	20	N2 K Na Mg	N2 K (Na) Mg	-

(A) Alternating

\+ To w. wheat only. Potatoes receive N3 1/2(PK (Na) Mg) on both plots 17 & 18.

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80/R/BK/1

N1,N2,N3,N4: 48, 96, 144, 192 kg N (as sulphate of ammonia until 1967, except N* which was nitrate of soda. All as 'Nitro-Chalk' in spring from 1968).
NO+3; N1+3: None in autumn + 144 kg N in spring; 48 kg N in autumn combine drilled + 144 kg N in spring.
P: 35 kg P as single superphosphate (triple superphosphate in 1974)
K: 90 kg K as sulphate of potash
Na: 55 kg Na as sulphate of soda
(Na): 16 kg Na as sulphate of soda until 1973
Mg: 30 kg Mg annually to Plot 14, 35 kg Mg every third year to other plots since 1974. All as kieserite since 1974, previously as sulphate of magnesia annually
D: Farmyard manure at 35 tonnes
C: Castor meal to supply 96 kg N
F: P K (Na) Mg H: Half rate

Strips of sub-plots: Until 1967 wheat alone was grown on the experiment, with some bare fallowing on strips of sub-plots. From 1968, ten sub-plots were started with the following cropping:-

SECTION		1968	69	70	71	72	73	74	75	76	77	78	79	80
SC0/W29	Section 0	W (F 1951)	W	W	W	W	W	W	W	W	W	W	W	W
SC1/W14	Section 1	W (F 1966)	W	W	W	W	W	W	W	W	W	W	W	W
POTATOES	Section 2	BE	W	P	BE	W	P	BE	W	P	BE	W	F	P
SC3/W1F	Section 3	W (F 1967)	W	F	W	W	F	W	W	F	W	W	F	W
SC4/W1P	Section 4	W (F 1965)	P	BE	W	P	BE	W	P	BE	W	P	P	W
SC5/W2F	Section 5	W (F 1965)	F	W	W	F	W	W	F	W	W	F	W	W
SC6/W3F	Section 6	F	W	W	F	W	W	F	W	W	F	W	W	W
-	Section 7	P	BE	W	P	BE	W	P	BE	W	P	BE	W	F
SC8/W8	Section 8*	W (F 1963)	W	W	W	F	W	W	W	W	W	W	W	W
SC9/W22	Section 9	W (F 1958)	W	W	W	W	W	W	W	W	W	W	W	W

W = w. wheat, P = potatoes, BE - s. beans, F = fallow

* No weedkillers

NOTES: (1) For a fuller record of treatments see 'Details' etc.
(2) Since autumn 1975 chalk is applied at 2.9 t each autumn to sets of Sections on a three-year cycle.
Year 1: Sections 1,2,3. Year 2: Sections 6,7,8 & 9.
Year 3: Sections 0,4,5. Chalk is applied to all plots of each section.
(3) On 12 Sept, 1979 glyphosate weedkiller was applied at 1.5 kg in 220 l to all plots on Section 9 and at 3.0 kg in 220 l to the following:

Plot	Section
03, 05	0, 1, 5, 6 and 7
06	0, 1, 6, 7
08	7
10, 18, 19	0, 1, 6
13, 14, 17	6
20	0, 1

Plots 05 and 06 on Section 9 received a second application of glyphosate (at 3.0 kg in 220 l) on the same day.

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80/R/BK/1

Standard applications:
W. wheat: Manures: Sections 6, 8 and 9 only: Chalk at 2.9 t.
Weedkillers: (Not section 8) Chlortoluron at 5.6 kg in 220 l.
Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 5.0 l) in 250 l.
Fungicides: Triadimefon at 0.13 kg in 250 l. Insecticide:
Demeton-s-methyl at 0.24 kg in 250 l. Omethoate (to section 3 only)
(as 'Folimat' at 1.1 l) in 220 l.
Potatoes: Weedkiller: Linuron at 1.1 kg in 900 l. Fungicide: Mancozeb
at 1.4 kg in 250 l applied on six occasions, with pirimicarb on the
first five. Insecticides: Phorate at 1.7 kg, at planting.
Pirimicarb at 0.14 kg.
Fallow: Section 7: Chalk at 2.9 t.

Seed: W. wheat: Flanders, sown at 200 kg
Potatoes: Pentland Crown.

Cultivations, etc.:-
ALL SECTIONS: Chalk applied: 19 Sept, 1979. Sulphate of potash,
sulphate of soda, and kieserite applied: 24 Sept. Castor meal and
superphosphate applied: 25 Sept. FYM applied: 26 Sept. Ploughed: 27
Sept.
CROPPED SECTIONS: W. wheat: Rotary harrowed: 1 Oct. Sections 1 & 2
rotary harrowed again: 2 Oct. Seed sown: 4 Oct. Chlortoluron
applied: 8 Oct. 'Folimat' applied (Section 3 only): 29 Feb, 1980. N
and 'Banlene Plus' applied: 10 Apr. Fungicide applied: 3 June.
Demeton-s-methyl applied: 23 June. Combine harvested: 21 Aug.
Potatoes: Chisel ploughed: 25 Jan, 1980. Spring-tine cultivated,
N applied: 17 Apr. Spike rotary cultivated; potatoes planted: 18
Apr. Grubbed: 25 Apr. Rotary ridged: 2 May. Weedkiller applied: 19
May. Fungicide applied with pirimicarb: 18 June, 30 June, 11 July,
24 July, 5 Aug. Fungicide applied alone: 18 Aug. Haulm mechanically
destroyed: 28 Aug. Lifted: 4 Sept.
FALLOW: Chisel ploughed: 1 Feb, 1980. Heavy spring-tine cultivated:
21 Apr. Ploughed twice: 12 May, 17 June. Spring-tine cultivated
twice: 23 May, 19 June. Rotary harrowed: 1 Aug.

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80/R/BK/1 WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SECTION PLOT	SC4/W1P	SC3/W1F	SC5/W2F	SC6/W3F	SC1/W14	SC9/W22	SC0/W29	SC8/W8	MEAN
01DN2PK	8.40	7.76	8.15	8.05	*	*	*	*	8.09
21DN2	8.46	8.18	8.21	8.48	8.44	8.16	8.35	3.84	7.77
22D	6.45	7.63	6.57	5.38	6.71	6.47	6.37	4.19	6.22
030	2.16	2.56	1.31	1.07	1.78	1.76	1.89	1.69	1.78
05F	2.43	2.96	1.30	1.11	1.49	1.91	2.10	3.02	2.04
06N1F	5.31	5.04	4.00	3.36	3.74	4.36	4.05	2.89	4.09
07N2F	7.35	6.89	6.51	5.85	6.25	6.24	5.89	2.73	5.96
08N3F	8.52	8.16	7.77	7.39	7.17	7.20	6.63	3.22	7.01
09N4F	8.81	8.03	8.11	7.93	7.56	7.63	7.13	3.97	7.40
10N2	4.60	3.62	5.83	4.22	3.69	2.75	4.20	2.18	3.88
11N2P	6.64	5.67	5.94	5.36	4.68	4.25	5.04	1.82	4.93
12N2PNA	6.80	6.18	5.96	5.69	5.35	4.96	5.46	1.67	5.26
13N2PK	7.10	6.79	6.11	5.96	5.84	6.32	5.70	2.61	5.80
14N2PKMG	7.52	7.11	6.07	5.97	6.13	3.77	5.90	2.64	5.64
15N3F	8.30	7.70	7.32	6.94	7.26	6.83	6.85	2.65	6.73
16N2F	7.07	6.70	6.15	5.81	5.69	5.91	5.68	1.96	5.62
17N1+3FH	8.23	7.89	7.50	6.92	6.63	6.89	6.55	1.68	6.54
18N0+3FH	7.78	7.57	7.25	6.61	6.01	6.67	6.35	2.02	6.28
19C	5.54	5.49	3.80	3.60	4.64	4.08	4.19	1.77	4.14
20NKMG	*	*	*	*	4.12	*	4.04	*	4.08

GRAIN MEAN DM% 82.6

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

SECTION PLOT	SC4/W1P	SC1/W14	MEAN
01DN2PK	8.06	*	8.06
21DN2	7.10	6.22	6.66
22D	6.43	5.76	6.10
030	1.46	1.28	1.37
05F	2.01	1.20	1.60
06N1F	4.19	2.19	3.19
07N2F	5.50	3.74	4.62
08N3F	6.17	4.71	5.44
09N4F	6.92	4.61	5.76
10N2	2.18	2.08	2.13
11N2P	3.67	2.62	3.14
12N2PNA	3.85	2.86	3.35
13N2PK	5.80	3.45	4.63
14N2PKMG	4.84	3.69	4.27
15N3F	6.59	4.68	5.64
16N2F	5.28	5.79	5.53
17N1+3FH	6.07	4.43	5.25
18N0+3FH	5.65	3.57	4.61
19C	3.94	2.00	2.97
20NKMG	*	3.08	3.08

STRAW MEAN DM% 88.2

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80/R/BK/1

POTATOES

***** TABLES OF MEANS *****

PLOT	TOTAL TUBERS TONNES/ HECTARE	% WARE 3.81 CM(1.5 INCH) RIDDLE
01DN2PK	52.9	98.0
21DN2	59.7	96.1
22D	52.5	96.8
030	10.8	94.5
05F	23.0	93.7
06N1F	38.1	93.0
07N2F	48.3	96.5
08N3F	55.3	95.9
09N4F	50.7	96.9
10N2	10.8	92.5
11N2P	16.1	75.3
12N2PNA	18.5	76.3
13N2PK	35.4	93.5
14N2PKMG	41.2	94.5
15N3F	49.1	95.0
16N2F	42.5	94.2
17N3FH	40.6	96.7
18N3FH	40.9	97.9
19C	22.7	93.9

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80/R/HB/2

HOOSFIELD

Object: To study the effects of organic and inorganic manures on continuous spring barley. From 1968 to 1978 a rotation of potatoes, beans and barley was practised. The rotation was discontinued in 1979 and the experiment reverted to continuous barley.

The 129th year, s. barley.

For previous years see 'Details' 1967 & 1973, Station Report for 1966 and 74-79/R/HB/2.

Treatments: All combinations of:-

1. MANURE Fertilisers, organic manures and frequency of barley cropping:

	Form of N 1852-1966	Additional treatments 1852-1979	Changes since 1980	Number of barley crops since last non-cereal
---13F	None	-	-	13 after fallow
-P-13F	None	P	-	13 after fallow
--K13F	None	K(Na)Mg	-	13 after fallow
-PK13F	None	PK(Na)Mg	-	13 after fallow
A--13F	A	-	-	13 after fallow
AP-13F	A	P	-	13 after fallow
A-K13F	A	K(Na)Mg	-	13 after fallow
APK13F	A	PK(Na)Mg	-	13 after fallow
N----13F	N	-	-	13 after fallow
NP---13F	N	P	-	13 after fallow
N-K--13F	N	K(Na)Mg	-	13 after fallow
NPK--13F	N	PK(Na)Mg	-	13 after fallow
N--S-13F	N	Si	Si omitted	13 after fallow
NP-S-13F	N	P Si	"	13 after fallow
N-KS-13F	N	K(Na)MgSi	"	13 after fallow
NPKS-13F	N	PK(Na)MgSi	"	13 after fallow
N---S2BE	N	-	Si added	2 after beans
NP--S2BE	N	P	"	2 after beans
N-K-S2BE	N	K(Na)Mg	"	2 after beans
NPK-S2BE	N	PK(Na)Mg	"	2 after beans
N--SS2BE	N	Si	-	2 after beans
NP-SS2BE	N	P Si	-	2 after beans
N-KSS2BE	N	K(Na)MgSi	-	2 after beans
NPKSS2BE	N	PK(Na)MgSi	-	2 after beans
C(--)13F	C	-	PKMg omitted	13 after fallow
C(P-)13F	C	P	"	13 after fallow
C(-K)13F	C	K(Na)Mg	"	13 after fallow
C(PK)13F	C	PK(Na)Mg	"	13 after fallow
C(--)3BE	C	-	"	3 after beans
C(P-)3BE	C	P	"	3 after beans
C(-K)3BE	C	K(Na)Mg	"	3 after beans
C(PK)3BE	C	PK(Na)Mg	"	3 after beans
C(--)2BE	C	-	"	2 after beans
C(P-)2BE	C	P	"	2 after beans
C(-K)2BE	C	K(Na)Mg	"	2 after beans
C(PK)2BE	C	PK(Na)Mg	"	2 after beans
C(--)2PO	C	-	"	2 after potatoes
C(P-)2PO	C	P	"	2 after potatoes
C(-K)2PO	C	K(Na)Mg	"	2 after potatoes
C(PK)2PO	C	PK(Na)Mg	"	2 after potatoes

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D13F	None	D	PKMg omitted	13 after fallow
(D)13F	(D)	-	"	13 after fallow
(A)13F	(Ashes)	-	"	13 after fallow
-13F	None	-	"	13 after fallow

Form of N: A, sulphate of ammonia: N, nitrate of soda - each to supply 48 kg N, C, castor meal to supply 96 kg N
P: 35 kg P as single superphosphate (triple superphosphate in 1974)
K: 90 kg K as sulphate of potash
(Na): 16 kg Na as sulphate of soda until 1973
Mg: 35 kg Mg, as kieserite every third year since 1974 (sulphate of magnesia annually until 1973)
Si: Silicate of soda at 450 kg
D: Farmyard manure at 35 tonnes. (D): until 1871 only
(Ashes): Weed ash 1852-1916, furnace ash 1917-1932, none since

2. N Nitrogen fertiliser (kg N), as 'Nitro-Chalk', since 1968 (cumulative N applications until 1973, on a cyclic system since 1974):

0
48
96
144

There are four extra plots testing all combinations of:-

1. MANURE Fertilisers other than magnesium:

551AN2PK	Plot 551 AN2PK	13th barley
561--PK	Plot 561 --PK	13th barley
571NN2--	Plot 571 NN2	13th barley
581NN2--	Plot 581 NN2	13th barley

N2: 96 kg N as 'Nitro-Chalk' since 1968. Other symbols as above.

2. MGNESIUM Magnesium fertiliser (kg Mg) as kieserite every third year since 1974:

0
35

NOTE: For a fuller record see 'Details' etc.

Basal applications: Weedkillers: Glyphosate at 1.5 kg in 220 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 kg) in 250 l. Fungicide: Tridemorph at 0.53 l in 250 l.

Seed: Georgie, sown at 150 kg.

Cultivations, etc.:- Glyphosate applied: 27 Sept, 1979. P applied: 1 Nov. K applied: 2 Nov. Chalk applied: 7 Nov. Silicate of soda and FYM applied, ploughed: 8 Nov. Spring-tine cultivated, seed sown: 21 Feb, 1980. N applied: 16 Apr. 'Brittox' and tridemorph applied: 9 May. Harvested: 18 Aug.

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80/R/HB/2

BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N MANURE	0	48	96	144	MEAN
---13F	1.15	2.11	2.19	2.70	2.04
-P-13F	1.67	3.06	3.88	3.66	3.07
--K13F	1.33	2.79	3.45	4.14	2.93
-PK13F	2.25	3.79	5.27	5.97	4.32
A--13F	1.05	1.86	2.34	2.12	1.84
AP-13F	2.06	3.08	3.06	2.55	2.69
A-K13F	1.39	2.27	2.89	2.88	2.36
APK13F	2.16	3.66	5.31	6.38	4.38
N----13F	1.19	1.33	2.02	1.90	1.61
NP---13F	2.31	3.90	3.80	4.32	3.58
N-K--13F	1.84	2.20	3.00	2.98	2.50
NPK--13F	1.99	4.26	5.45	6.43	4.53
N--S-13F	2.04	3.56	3.90	4.96	3.62
NP-S-13F	2.24	4.31	5.30	6.01	4.46
N-KS-13F	1.88	4.05	5.83	5.42	4.29
NPKS-13F	3.22	4.36	5.84	6.79	5.05
N---S2BE	1.93	3.67	5.02	4.51	3.78
NP--S2BE	2.45	4.64	5.10	6.25	4.61
N-K-S2BE	2.66	4.00	5.11	5.30	4.27
NPK-S2BE	2.81	5.00	6.13	7.18	5.28
N--SS2BE	2.64	3.80	5.11	5.39	4.23
NP-SS2BE	2.89	4.58	6.03	6.56	5.01
N-KSS2BE	2.48	4.91	6.15	5.73	4.82
NPKSS2BE	3.01	4.91	6.92	6.78	5.41
C(--)13F	2.06	3.26	4.57	5.01	3.73
C(P-)13F	2.24	3.85	5.78	6.16	4.51
C(-K)13F	1.86	3.62	5.82	5.27	4.14
C(PK)13F	2.88	4.45	5.91	6.83	5.02
C(--)3BE	5.07	2.46	5.63	4.60	4.44
C(P-)3BE	2.53	5.00	6.06	5.64	4.81
C(-K)3BE	2.68	4.65	5.55	6.12	4.75
C(PK)3BE	3.52	5.61	6.17	5.99	5.32
C(--)2BE	2.62	5.10	5.55	6.34	4.90
C(P-)2BE	2.95	4.45	6.91	6.48	5.20
C(-K)2BE	2.81	3.52	5.67	6.41	4.60
C(PK)2BE	3.68	5.16	6.05	6.66	5.39
C(--)2PO	2.18	4.81	5.79	5.89	4.67
C(P-)2PO	1.84	4.73	6.30	5.95	4.70
C(-K)2PO	2.52	4.50	5.17	5.71	4.48
C(PK)2PO	2.95	5.10	6.31	6.78	5.29
D13F	6.84	6.87	7.00	7.30	7.01
(D)13F	2.61	3.39	4.19	4.31	3.62
(A)13F	1.48	2.93	3.69	5.21	3.33
-13F	1.56	2.64	3.72	3.08	2.75
MEAN	2.44	3.91	5.02	5.29	4.17

GRAIN MEAN DM% 80.3

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80/R/HB/2

BARLEY

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	48	96	144	MEAN
MANURE					
---13F	0.20	0.61	0.59	0.99	0.60
-P-13F	0.39	0.61	1.62	1.22	0.96
--K13F	0.37	1.14	1.80	1.73	1.26
-PK13F	0.87	1.46	2.40	2.62	1.84
A--13F	0.20	0.40	1.00	0.60	0.55
AP-13F	0.20	0.61	1.01	1.04	0.71
A-K13F	0.37	0.76	1.08	1.24	0.86
APK13F	0.58	1.57	2.27	2.99	1.85
D13F	3.13	3.36	3.69	4.09	3.57
(D)13F	1.01	1.91	2.38	2.89	2.05
(A)13F	0.26	1.03	1.32	2.27	1.22
-13F	0.25	0.76	1.66	1.49	1.04
MEAN	0.65	1.19	1.73	1.93	1.38

STRAW MEAN DM% 82.8

PLOT AREA HARVESTED 0.00007

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

MANURE	551AN2PK	561--PK	571NN2--	581NN2--	MEAN
MGNESIUM					
0	5.30	1.74	3.96	2.30	3.33
35	5.38	1.64	3.69	2.39	3.27
MEAN	5.34	1.69	3.83	2.34	3.30

GRAIN MEAN DM% 79.8

PLOT AREA HARVESTED 0.00306

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80/R/WF/3

WHEAT AND FALLOW

Object: To study the effects of fallowing for one or three years on unmanured w. wheat - Hoosfield.

The 125th year, w. wheat.

For previous years see 'Details' 1967, 1973 and 74-79/R/WF/3.

Whole plot dimensions: 9.60 x 52.1.

Treatments:

PLOT	Plot number and phase of fallowing cycle (up to 1980):-								
-	Plot 1	F	F	W	F	W	F	W	F	F
-	Plot 2	F	W	F	W	F	F	F	W	F
3 FALL 1	Plot 3	W	F	F	F	W	F	W	F	W
-	Plot 4	F	W	F	W	F	W	F	F	F
5 FALL 1	Plot 5	W	F	W	F	F	F	W	F	W
-	Plot 6	F	F	F	W	F	W	F	W	F
7 FALL 3	Plot 7	W	F	W	F	W	F	F	F	W
-	Plot 8	F	W	F	F	F	W	F	W	F

W = w. wheat, F = fallow.

Basal applications: Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l. Insecticide: Demeton-s-methyl at 0.24 kg in 250 l.

Seed: Flanders, sown at 200 kg.

Cultivations, etc.:
Wheat plots: Ploughed: 11 Oct, 1979. Rotary harrowed, seed sown: 16 Oct. Weedkiller applied: 16 Apr, 1980. Insecticide applied: 24 June. Combine harvested: 21 Aug.
Fallow plots: Ploughed: 11 Oct, 1979. Heavy spring-tine cultivated: 21 Apr, 1980. Ploughed: 9 May, 16 June. Spring-tine cultivated: 22 May, 19 June. Rotary harrowed: 1 Aug.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PLOT	3 FALL 1	5 FALL 1	7 FALL 3	MEAN
	1.28	1.43	1.69	1.47

GRAIN MEAN DM% 80.9

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

PLOT	3 FALL 1	5 FALL 1	7 FALL 3	MEAN
	0.75	0.68	0.75	0.73

STRAW MEAN DM% 90.1

PLOT AREA HARVESTED 0.01483

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80/R/EX/4

EXHAUSTION LAND

Object: To study the residual effects of manures, applied 1856-1901, on the yield of continuous s. barley - Hoosfield.

The 125th year, s. barley.

For previous years see 'Details' 1967, 1973 and 74-79/R/EX/4.

Treatments: All combinations of:-

Whole plots

1. PLOTFERT(01) Plot numbers and manuring 1876-1901:

1-	Plot 1 None
2-	Plot 2 None
3D	Plot 3 D
4D	Plot 4 D
5N	Plot 5 N
6N*	Plot 6 N*
7NMIN	Plot 7 N P K Na Mg
8N*MIN	Plot 8 N* P K Na Mg
9P	Plot 9 P
10MIN	Plot 10 P K Na Mg

N - 96 kg N as ammonium salts
N* - 96 kg N as nitrate of soda
P - 34 kg P as superphosphate
K - 137 kg K as sulphate of potash
Na - 16 kg Na as sulphate of soda
Mg - 11 kg Mg as sulphate of magnesia
D - Farmyard manure at 35 tonnes
MIN - P K Na Mg

Sub plots

2. N Nitrogen fertiliser (kg N) (basal until 1975, on a cyclic system since 1976):

0
48
96
144

For a fuller record of treatments see 'Details' 1967 etc.

Basal applications: Chalk at 2.9 t. Weedkillers: Glyphosate at 1.5 l in 220 l. Mecoprop, bromoxynil, ioxynil and linuron with xylene (as 'Springclene' at 3.5 l) in 250 l applied with the fungicide. Fungicide: Tridemorph at 0.53 kg.

Seed: Georgie, sown at 160 kg.

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80/R/EX/4

Cultivations, etc.:- Glyphosate applied: 27 Sept, 1979. Chalk applied: 7 Nov. Ploughed: 26 Nov. Rotary harrowed, seed sown: 9 Apr, 1980. N applied: 9 May. 'Springclene' and tridemorph applied: 9 June. Combine harvested: 2 Sept.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N / PLOTFERT(01)	0	48	96	144	MEAN
1-	1.37	1.77	1.58	1.18	1.48
2-	0.77	0.74	1.17	1.15	0.96
3D	2.20	3.40	3.84	3.58	3.26
4D	2.24	2.51	2.98	2.67	2.60
5N	1.01	1.52	1.71	0.98	1.30
6N*	0.40	0.35	1.00	1.05	0.70
7NMIN	1.66	2.92	3.16	2.98	2.68
8N*MIN	1.73	1.67	2.27	2.08	1.94
9P	1.71	2.91	3.19	2.92	2.68
10MIN	1.33	1.78	2.43	2.09	1.91
MEAN	1.44	1.96	2.33	2.07	1.95

GRAIN MEAN DM% 81.7

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N / PLOTFERT(01)	0	48	96	144	MEAN
1-	0.46	0.68	0.60	0.38	0.53
2-	0.34	0.32	0.53	0.44	0.41
3D	0.84	1.64	2.01	2.07	1.64
4D	0.62	1.25	1.63	1.82	1.33
5N	0.34	0.61	0.68	0.39	0.50
6N*	0.26	0.18	0.56	0.41	0.35
7NMIN	0.70	1.34	1.62	1.68	1.34
8N*MIN	0.62	1.02	1.41	1.37	1.10
9P	0.42	1.08	1.44	1.52	1.11
10MIN	0.49	0.95	1.47	1.56	1.12
MEAN	0.51	0.91	1.19	1.16	0.94

STRAW MEAN DM% 83.6

PLOT AREA HARVESTED 0.00728

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80/R/PG/5

PARK GRASS

Object: To study the effects of organic and inorganic manures and lime on old grass (for hay).

The 125th year, hay.

For previous years see 'Details' 1967 and 1973 and 74-79/R/PG/5.

Treatments:

Whole plots

MANURE	Fertilisers and organic manures:-	
N1	Plot 1	N1
O(D)	Plot 2	None (D until 1863)
O/PLOT3	Plot 3	None
P	Plot 4-1	P
N2P	Plot 4-2	N2 P
N1MIN	Plot 6	N1 P K Na Mg
MIN	Plot 7	P K Na Mg
PNAMG	Plot 8	P Na Mg
N2MIN	Plot 9	N2 P K Na Mg
N2PNAMG	Plot 10	N2 P Na Mg
N3MIN	Plot 11-1	N3 P K Na Mg
N3MINSI	Plot 11-2	N3 P K Na Mg Si
O/PLOT12	Plot 12	None
D/F	Plot 13	D/F
N2*MIN	Plot 14	N2* P K Na Mg
MIN(N2*)	Plot 15	P K Na Mg (N2* until 1875)
N1*MIN	Plot 16	N1* P K Na Mg
N1*	Plot 17	N1*
N2KNAMG	Plot 18	N2 K Na Mg
D	Plot 19	D
D/N*PK	Plot 20	D/N*P K

N1, N2, N3:	48, 96, 144 kg N as sulphate of ammonia
N1*, N2*:	48, 96 kg N as nitrate of soda (30 kg N to Plot 20, only in years with no farmyard manure)
P:	35 kg P (15 kg P to Plot 20, only in years with no farmyard manure) as single superphosphate (triple superphosphate in 1974)
K:	225 kg K (45 kg K to Plot 20, only in years with no farmyard manure) as sulphate of potash
Na:	15 kg Na as sulphate of soda
Mg:	10 kg Mg as sulphate of magnesia
Si:	Silicate of soda at 450 kg
D:	Farmyard manure at 35 tonnes every fourth year
F:	Fish meal every fourth year to supply 63 kg N
MIN:	P K Na Mg

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80/R/PG/5

Sub plots

LIME	Liming:-
A	a Ground chalk applied as necessary to achieve pH7
B	b Ground chalk applied as necessary to achieve pH6
C	c Ground chalk applied as necessary to achieve pH5
D	d None

NOTE: Lime was applied regularly, and at the same rate, to all a and b sub plots of Plots 1 to 17 (except 12) from 1924. Differential liming started in 1965 on certain b and c sub plots (except on Plot 12) and in 1976 on certain a sub plots (including Plot 12) and 12b.

Additional sub plots (Plots 18, 19 and 20 only) (tonnes CaCO3 applied every fourth year 1920-1964):-

N2KNAMG0	18-1	None
N2KNAMG2	18-2	13.5
N2KNAMG1	18-3	7.9
D0	19-1	None
D2	19-2	6.3
D1	19-3	1.1
D/N*PK0	20-1	None
D/N*PK2	20-2	5.6
D/N*PK1	20-3	1.1

Since 1965 Plot 18-1 has been split into two for treatments 'c' and 'd' above and Plot 18-3 split into two for treatments 'a' and 'b'. The remaining sub-plots of Plots 18, 19 and 20 are treated as 'a'.

NOTE: For a fuller record of treatments see 'Details' etc.

Cultivations, etc.:- Superphosphate applied: 2 Nov, 1979. Remaining mineral fertilisers applied: 19 Nov. First N dressing applied: 11 Apr, 1980. Second N dressing applied: 13 May. Cut: 4 June (except O/PLOT 3, cut 16 June), 28 Oct.

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80/R/PG/5

1ST CUT (4/6/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

LIME / MANURE	A	B	C	D	MEAN
N1	1.23	1.08	1.00	0.20	0.88
O(D)	1.25	1.22	0.92	0.99	1.10
O/PLOT3	1.08	1.46	0.73	0.85	1.03
P	1.88	1.96	1.16	1.10	1.53
N2P	1.95	1.62	1.80	1.33	1.68
N1MIN	3.91	3.80			3.85
MIN	3.53	3.70	1.48	1.22	2.48
PNAMG	1.38	1.54	1.31	1.31	1.39
N2MIN	4.27	4.34	3.13	2.25	3.50
N2PNAMG	2.52	2.41	2.33	1.56	2.20
N3MIN	3.47	4.14	2.95	2.65	3.30
N3MINSI	4.59	4.22	4.13	2.83	3.94
O/PLOT12	1.90	1.41	0.98	1.07	1.34
D/F	3.03	3.33	2.55	2.15	2.77
N2*MIN	3.95	4.61	5.72	5.84	5.03
MIN(N2*)	3.05	3.53	1.27	1.14	2.25
N1*MIN	4.11	4.00	2.92	3.46	3.62
N1*	1.67	1.86	2.22	1.85	1.90
N2KNAMGO			0.41	0.27	0.34
N2KNAMG2	1.23				1.23
N2KNAMG1	1.38	1.44			1.41
DO	2.29				2.29
D2	3.00				3.00
D1	2.62				2.62
D/N*PKO	3.99				3.99
D/N*PK2	4.25				4.25
D/N*PK1	4.27				4.27

1ST CUT MEAN DM% 27.0

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80/R/PG/5

2ND CUT (29/10/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

LIME / MANURE	A	B	C	D	MEAN
N1	1.55	2.19	0.97	1.03	1.43
O(D)	2.24	1.98	1.90	1.96	2.02
O/PLOT3	0.94	1.48	0.87	1.08	1.09
P	1.69	1.81	1.64	1.69	1.71
N2P	1.35	1.82	1.22	2.26	1.66
N1MIN	2.94	2.43			2.68
MIN	2.80	3.10	1.85	1.41	2.29
PNAMG	1.82	2.27	1.92	2.03	2.01
N2MIN	2.66	2.63	1.74	2.67	2.43
N2PNAMG	1.77	2.21	1.96	2.65	2.15
N3MIN	2.64	2.71	2.50	3.77	2.90
N3MINSI	3.01	2.66	2.80	4.17	3.16
O/PLOT12	3.71	2.45	1.78	2.08	2.51
D/F	3.73	3.76	2.90	2.65	3.26
N2*MIN	2.13	2.74	3.52	2.80	2.80
MIN(N2*)	2.40	3.09	1.44	1.39	2.08
N1*MIN	2.90	2.70	2.64	2.48	2.68
N1*	1.96	2.14	2.71	2.20	2.25
N2KNAMG0			0.79	0.87	0.83
N2KNAMG2	2.06				2.06
N2KNAMG1	1.94	2.45			2.20
D0	2.80				2.80
D2	3.03				3.03
D1	3.00				3.00
D/N*PK0	2.98				2.98
D/N*PK2	4.12				4.12
D/N*PK1	3.69				3.69

2ND CUT MEAN DM% 25.0

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80/R/PG/5

TOTAL OF 2 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

LIME / MANURE	A	B	C	D	MEAN
N1	2.78	3.27	1.96	1.22	2.31
O(D)	3.49	3.21	2.82	2.95	3.12
O/PLOT3	2.02	2.94	1.61	1.93	2.12
P	3.57	3.77	2.80	2.79	3.23
N2P	3.31	3.44	3.02	3.60	3.34
N1MIN	6.85	6.23			6.54
MIN	6.34	6.80	3.33	2.63	4.78
PNAMG	3.20	3.81	3.23	3.34	3.39
N2MIN	6.94	6.97	4.87	4.92	5.93
N2PNAMG	4.29	4.62	4.28	4.21	4.35
N3MIN	6.11	6.85	5.45	6.42	6.21
N3MINSI	7.60	6.88	6.92	7.00	7.10
O/PLOT12	5.61	3.86	2.77	3.16	3.85
D/F	6.77	7.09	5.46	4.81	6.03
N2*MIN	6.09	7.35	9.24	8.64	7.83
MIN(N2*)	5.45	6.61	2.71	2.53	4.33
N1*MIN	7.01	6.70	5.55	5.94	6.30
N1*	3.64	4.00	4.93	4.04	4.15
N2KNAMG0			1.21	1.14	1.17
N2KNAMG2	3.29				3.29
N2KNAMG1	3.32	3.89			3.61
D0	5.09				5.09
D2	6.03				6.03
D1	5.62				5.62
D/N*PK0	6.96				6.96
D/N*PK2	8.36				8.36
D/N*PK1	7.95				7.95

TOTAL OF 2 CUTS MEAN DM% 26.0

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80/R/AG/6

AGDELL

Object: To study, by crop yields and soil analyses, the residual values of phosphate and potash applied in the period 1848-1951 and further dressings since 1964.

The eleventh year of revised scheme, s. beans, w. wheat.

For previous years see 'Details' 1967 and 1973, and 74-79/R/AG/6.

Treatments: All combinations of:-

Whole plots

1. OLDRESD — Fertilisers and organic manures applied to roots every fourth year, in the period 1848-1948:

NONE	None
PKNAMG	P K Na Mg
NPKNAMGC	N P K Na Mg C

N:	48 kg N as sulphate of ammonia
P:	41 kg P as superphosphate
K:	224 kg K as sulphate of potash
Na:	16 kg Na as sulphate of soda
Mg:	11 kg Mg as sulphate of magnesia
C:	Castor meal at 2240 kg supplying about 112 kg N

2. RN CROP — Rotation 1848-1951 and crop in 1980:

F/WHEAT	With fallow: Roots (turnips or swedes), s. barley, fallow, w. wheat 1848-1951. W. wheat (after s. beans 1979)
L/BEANS	With legume: Roots, s. barley, legume (clover or beans), w. wheat 1848-1951. S. beans (after grass 1979)

Half plots

3. 1964RESD — Residues of 1964 treatments:

P
K

Quarter plots

4. PREVCROP — Previous cropping 1958-69 on P-test half plots, 1958-70 on K-test half plots:

ARABLE	Arable or fallow
GRASS	Grass

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80/R/AG/6

Sixteenth plots

5. P_2O_5 64 K_2O 64

Rates of 1964 treatments (kg):

P_2O_5 to P-test half plots	K_2O to K-test half plots
0	0
500	315
1000	630
2000	1260

Thirty second plots

6.

On P-test half plots:
To RN CROP F/WHEAT. Residues of P_2O_5 applied 1970-72 (total, kg) and 1979 (kg):

P_2O_5 729

(0)0
(375)150

To RN CROP L/BEANS. Residues of P_2O_5 applied 1970-72 (total, kg) and a fresh dressing in 1980 (kg):

P_2O_5 720

(0)0
(375)150

On K-test half plots:
To RN CROP F/WHEAT. Residues of K_2O applied 1973-76 (total, kg) and 1979 (kg):

K_2O 769

(0)0
(870)300

To RN CROP L/BEANS. Residues of K_2O applied 1973-76 (total, kg) and a fresh dressing in 1980 (kg):

K_2O 760

(0)0
(870)300

Standard applications:

W. wheat: Manures: 'Nitro-Chalk' at 580 kg. Weedkillers: Glyphosate at 1.5 kg in 220 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 900 l.

W. beans: Weedkillers: Trietazine with simazine (as 'Remtal SC' at 2.5 l) in 250 l. Permethrin at 0.13 kg in 900 l. Pirimicarb at 0.14 kg in 250 l.

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80/R/AG/6

Seed: Wheat: Flanders, sown at 200 kg.
Beans: Minden, sown at 220 kg.

Cultivations, etc.:-
Wheat: Glyphosate applied: 27 Sept, 1979. Disc harrowed twice, seed sown: 15 Oct. N applied: 15 Apr, 1980. 'Brittox' applied: 25 Apr. Combine harvested: 21 Aug.
Beans: Test P and K applied: 17 July, 1979. Ploughed: 18 July. Heavy spring-tine cultivated: 31 July, 10 Aug. Rotary harrowed: 4 Mar, 1980. Seed sown: 5 Mar. Weedkiller applied: 21 Mar. Permethrin applied: 6 May. Pirimicarb applied: 16 July. Combine harvested: 18 Sept.

SPRING BEANS P PLOTS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	OLDRESD	NONE		PKNAMG		NPKNAMG	
	P205 720	(0)0	(375)150	(0)0	(375)150	(0)0	(375)150
PREVCROP	P205 64						
ARABLE	0	2.13	2.52	1.41	1.61	0.99	1.76
	500	1.50	1.42	1.34	1.75	1.57	1.78
	1000	1.43	1.49	2.77	2.34	0.78	0.42
	2000	2.30	1.82	2.12	2.42	1.56	1.14
GRASS	0	1.67	2.21	1.79	2.50	1.74	1.53
	500	2.55	3.11	1.55	1.90	1.61	1.54
	1000	1.59	1.74	2.06	2.48	1.75	1.68
	2000	2.62	3.12	2.57	2.43	0.98	1.18

GRAIN MEAN DM% 78.9

SPRING BEANS K PLOTS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	OLDRESD	NONE		PKNAMG		NPKNAMG	
	K20 760	(0)0	(870)300	(0)0	(870)300	(0)0	(870)300
PREVCROP	K20 64						
ARABLE	0	0.94	2.68	1.39	1.18	1.20	1.00
	315	1.00	1.43	1.35	1.75	1.13	1.00
	630	1.01	1.27	1.03	0.83	0.92	0.84
	1260	1.90	2.60	1.41	2.12	1.42	1.20
GRASS	0	1.01	1.85	1.12	1.41	0.62	1.46
	315	1.78	2.96	1.34	1.77	0.48	1.24
	630	1.20	2.82	1.42	1.70	1.69	2.10
	1260	0.93	2.23	1.84	2.41	1.13	1.97

GRAIN MEAN DM% 78.6

PLOT AREA HARVESTED (OLDRESD NONE) 0.00117

PLOT AREA HARVESTED (REMAINDER) 0.00132

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80/R/AG/6

WINTER WHEAT P PLOTS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	P205 729	(0)0	(375)150	(0)0	(375)150	(0)0	(375)150
PREVCROP	P205 64						
ARABLE	0	4.28	5.20	4.21	4.66	5.64	6.26
	500	4.26	5.07	5.36	5.61	6.56	5.50
	1000	5.30	5.54	4.64	5.30	4.94	5.74
	2000	4.54	4.80	6.04	6.20	6.29	6.64
GRASS	0	4.54	5.85	3.48	4.89	5.12	5.40
	500	4.46	4.16	5.89	6.25	4.67	4.94
	1000	4.87	5.43	5.43	5.50	5.11	6.60
	2000	5.07	5.73	6.39	6.36	4.88	5.33

GRAIN MEAN DM% 82.3

WINTER WHEAT K PLOTS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	OLDRESD	NONE		PKNAMG		NPKNAMGC	
	K20 769	(0)0	(870)300	(0)0	(870)300	(0)0	(870)300
PREVCROP	K20 64						
ARABLE	0	5.59	4.27	5.80	5.13	5.37	6.03
	315	4.73	4.56	5.22	5.76	5.73	6.16
	630	4.60	4.97	4.57	4.84	5.89	5.73
	1260	4.79	4.97	5.09	5.22	6.00	5.70
GRASS	0	4.58	4.42	5.73	5.43	6.07	5.99
	315	5.13	5.15	5.92	5.99	6.15	6.35
	630	4.99	5.89	5.74	5.71	4.54	6.05
	1260	5.52	5.52	5.99	5.92	5.69	6.22

GRAIN MEAN DM% 82.4

PLOT AREA HARVESTED (OLDRESD NONE) 0.00120

PLOT AREA HARVESTED (REMAINDER) 0.00134

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80/R/BN/7

BARNFIELD

Object: The experiment was designed to study the effects of organic and inorganic manures on continuous root crops. It has been progressively modified to study effects on other crops.

Sections 1 and 2 fallow. The sixth year of Italian ryegrass on the rest of the experiment.

For previous years see 'Details' 1967 & 1973 and 74-79/R/BN/7.

Plot dimensions: Ryegrass: 10.7 x 55.9.

Treatments to ryegrass: All combinations of:-

Whole plots

1. MANURE — Fertilisers and organic manures:

DN	D N
DNPK	D N P K
NPKMG	N P K (Na) Mg
NP	N P
NPK	N P K
NPMG	N P (Na) Mg
N	N

N: 100 kg N before first cut, 75 kg N after first and second cuts. All as 'Nitro-Chalk'.
P: 35 kg P as single superphosphate (triple superphosphate in 1974).
K: 225 kg K as sulphate of potash
(Na): 90 kg Na as sodium chloride until 1973
Mg: 90 kg Mg as kieserite every fourth year since 1974 (sulphate of magnesia until 1973).
D: Farmyard manure at 35 tonnes (until 1975).

Quarter plots

2. NFORMRES — Residues of forms of N (each supplying 96 kg N):

NS	Nitrate of soda
SA	Sulphate of ammonia
SA/CM	Sulphate of ammonia + castor meal
CM	Castor meal

Castor meal last applied 1961, others until 1959.

Plus one plot MANURE NKMG

NOTES: (1) Yields were taken only from half plots cropped with sugar beet in 1973.
(2) P K and D treatments were applied to Sections 1 and 2, fallow in 1980.

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80/R/BN/7

Cultivations, etc.:- Ryegrass and fallow: P and K applied: 1 Nov, 1979.
Ryegrass: N applied: 13 Mar, 1980, 5 June, 26 July. Cut: 30 May, 21 July, 27 Oct.
Fallow: FYM applied: 2 Jan, 1980. Ploughed: 17 Jan. Heavy spring-tine cultivated: 22 Apr. Spring-tine cultivated: 22 May. Rotary cultivated: 19 June. Rotary harrowed: 1 Aug.

1ST CUT (30/5/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	5.62	5.91	5.41	5.89	5.71
DNPK	6.09	6.02	5.75	5.88	5.93
NPKMG	3.99	3.73	4.02	4.25	4.00
NP	3.07	3.05	3.27	3.30	3.17
NPK	3.96	3.91	4.02	4.20	4.02
NPMG	3.02	2.99	3.18	3.25	3.11
N	3.21	2.09	3.09	3.13	2.88
MEAN	4.14	3.96	4.11	4.27	4.12

MANURE NKMG 3.41

GRAND MEAN 4.09

1ST CUT MEAN DM% 30.9

2ND CUT (21/7/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	2.55	2.67	2.44	2.20	2.46
DNPK	2.80	2.64	2.73	2.76	2.73
NPKMG	1.80	1.79	2.13	2.12	1.96
NP	1.69	1.26	1.24	1.57	1.44
NPK	2.02	1.88	2.09	1.93	1.98
NPMG	1.80	1.43	1.51	1.43	1.54
N	1.38	1.02	1.13	1.02	1.14
MEAN	2.01	1.81	1.90	1.86	1.89

MANURE NKMG 1.78

GRAND MEAN 1.89

2ND CUT MEAN DM% 22.3

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80/R/BN/7

3RD CUT (27/10/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	2.73	2.63	2.68	2.83	2.72
DNPK	2.38	2.57	2.77	2.86	2.65
NPKMG	2.42	2.67	2.69	2.58	2.59
NP	1.99	2.08	1.91	1.83	1.95
NPK	2.43	2.37	2.74	2.31	2.46
NPMG	2.00	1.83	1.79	1.77	1.85
N	1.90	1.96	1.45	1.41	1.68
MEAN	2.26	2.30	2.29	2.23	2.27

MANURE NKMG 2.25

GRAND MEAN 2.27

3RD CUT MEAN DM% 22.6

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

NFORMRES MANURE	NS	SA	SA/CM	CM	MEAN
DN	10.89	11.21	10.53	10.92	10.89
DNPK	11.27	11.24	11.25	11.50	11.31
NPKMG	8.20	8.19	8.85	8.95	8.55
NP	6.74	6.39	6.43	6.70	6.57
NPK	8.41	8.16	8.85	8.44	8.47
NPMG	6.82	6.25	6.48	6.45	6.50
N	6.49	5.07	5.67	5.56	5.70
MEAN	8.40	8.07	8.29	8.36	8.28

MANURE NKMG 7.43

GRAND MEAN 8.25

TOTAL OF 3 CUTS MEAN DM% 25.3

SUB PLOT AREA HARVESTED 0.00568

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80/R/GC/8

GARDEN CLOVER

Object: To study yields and pathogens of red clover grown continuously - Manor Garden.

Sponsor: J. McEwen.

The 127th year, red clover.

For previous years see 'Details' 1967 & 1973, and 74-79/R/GC/8.

Design: 2 blocks of 2 plots.

Whole plot dimensions: 1.02 x 1.42.

Treatments:

FUNGCIDE	Fungicide to control Sclerotinia trifoliorum:
NONE	None
BENOMYL	Benomyl at 0.6 kg in 800 l on 28 Sept, 1979; 29 Oct, 30 Nov, 4 Jan, 1980 and 11 Feb.

Basal applications: Manures: Chalk at 1.25 t. (0:14:28) at 540 kg. Mg at 50 kg, as Epsom salts. N at 125 kg, as 'Nitro-Chalk' in spring and after each cut except the last. Nematicide: Aldicarb at 10 kg.

Seed: Hungaropoly, sown at 34 kg in April 1979.

Cultivations, etc.:- Chalk, PK and Mg applied: 1 Oct, 1979. N applied: 6 Mar, 1980. Aldicarb applied: 9 Apr. Cut and N applied: 15 May, 19 June, 21 July, 18 Aug. Cut: 25 Sept.

NOTE: N, P, K, Ca and Mg contents of herbage were measured.

1ST CUT (15/5/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	2.64	3.92	3.28

1ST CUT MEAN DM% 17.0

2ND CUT (19/6/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	3.06	3.18	3.12

2ND CUT MEAN DM% 12.4

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80/R/GC/8

3RD CUT (21/7/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	2.41	2.64	2.53

3RD CUT MEAN DM% 11.1

4TH CUT (18/8/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	2.52	2.64	2.58

4TH CUT MEAN DM% 10.8

5TH CUT (25/9/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	2.18	2.22	2.20

5TH CUT MEAN DM% 11.4

TOTAL OF 5 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BENOMYL	MEAN
	12.81	14.60	13.71

TOTAL OF 5 CUTS MEAN DM% 12.5

PLOT AREA HARVESTED 0.00010

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80/S/RN/1

ROTATION I

Object: To compare nutrient cycles, uptakes of nutrients and responses to fresh P and K. To obtain an estimate of the rate of release of nutrients, particularly K, from Saxmundham soil - Saxmundham.

Sponsor: A.E. Johnston.

The 82nd year, grass, w. wheat, s. barley and potatoes.

For previous years see 'Details' 1967 & 1973, and 74-79/S/RN/1.

Whole plot dimensions (new treatments): 5.49 x 17.1.

Treatments: From 1899 to 1969 the experiment followed a four-course rotation of w. wheat, roots, s. barley, legumes. Each phase of the rotation was present each year on a separate block. From 1966 each plot was divided, a small area at the south end being continued under the original treatment until 1979 (OLDTREAT), modified treatments (NEWTREAT) being applied on the larger sub-plots (see below).

In 1970 the rotation was stopped and each pair of blocks was divided for lucerne and grass (the OLDTREAT sub-plots form a part of the Grass area). In 1977 lucerne was ploughed on one pair of blocks to start an arable rotation and in 1978 lucerne on the other blocks was replaced by a grass/clover mixture. The grass/clover mixture was ploughed in 1979 for a test of subsoiling. Remaining treatments to grass in 1980 were:

TREATMENT 1899-1965	OLDTREAT Grass 1966-79	NEWTREAT Grass 1966-80
	MANURE	MANURE
D	(D)	(D)N
B	B	BN
N	N	(N)P2N
P	P	(P)P1N
K	K	(K)P2KN
-	-	(-)P2N
PK	PK	(PK)P1KN
NK	NK	(NK)P2KN
NP	NP	(NP)P1N
NPK	NPK	(NPK)P1KN

D: Farmyard manure at 15 tonnes
(D): Farmyard manure at 30 tonnes (1966-1969 15 tonnes on OLDTREAT), 60 tonnes in autumn 1969, none since
B: Bone meal at 0.5 tonnes
N: 1899-1965 - 38 kg N as nitrate of soda. Since 1970 - 100 kg N (38 kg N on OLDTREAT) per cut as 'Nitro-Chalk'
P: 1899-1965 40 kg P205 as single superphosphate. Since 1966 50 kg P205 as triple superphosphate
P1,P2: 50, 100 kg P205 as triple superphosphate
K: 1899-1965 63 kg K20 as muriate of potash. Since 1966 - 126 kg K20 (75 kg K20 on OLDTREAT)

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80/S/RN/1

NOTES: (1) For a fuller record of treatments see 'Details' etc.
(2) On OLDTREAT grass, clover appeared naturally on some plots in 1975. To unify the plots white clover was sown on all at 33 kg.
(3) From 1980 treatments have not been applied to OLDTREAT grass and yields have not been taken.

The pair of blocks in arable crops since 1977 are divided into three for three phases of the four-course rotation w. barley, potatoes, beans, w. wheat. Whole plot treatments are continued as for NEWTREAT grass except w. beans are not given N and plots previously given farmyard manure now receive phosphate fertiliser. Plots on this area are randomly subdivided for each crop for a test of potash fertiliser. All combinations of the following are present (on w. wheat, w. barley and potatoes in 1980):-

1. MANURE

(D)P2N
BN
(N)P2N
(P)P1N
(K)P2KN
(-)P2N
(PK)P1KN
(NK)P2KN
(NP)P1N
(NPK)P1KN

Symbols as above except N = 94 kg (including 31 kg at sowing) to w. wheat and w. barley; 251 kg to potatoes.

2. POTASH — Additional potash fertiliser, as muriate of potash (kg K20):

w. wheat w. barley	Potatoes
0	0
63	251

The pair of blocks testing subsoiling (in s. barley 1980) had all combinations of:

1. MANURE (as for arable crops above, N as for w. wheat above) and:

2. TREATMNT

CNVNTIAL	Conventional, mouldboard ploughed on 30 May, 1979
SUBDUG	Subsoil dug by Wye double digger on 24 May.
SUBDUG+F	Subsoil dug by Wye double digger on 24 May incorporating P at 374 kg and K at 712 kg (as 0:20:20) into the subsoil at the time of working

NOTE: W. wheat was sown on the subsoiling test section but was severely damaged by wheat bulb fly. The area was rotary cultivated in April and s. barley was sown.

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80/S/RN/1

Standard applications:
Arable test crop section:
W. wheat and w. barley: Weedkillers: Isoproturon at 2.7 kg in 280 l. Ioxynil at 0.63 kg and mecoprop at 1.9 kg in 220 l.
W. wheat only: Fungicides: Carbendazim (as 'Bavistin' at 0.50 kg) in 280 l applied with the tridemorph. Tridemorph at 0.53 kg. Carbendazim at 0.25 kg with zineb at 1.6 kg applied in 220 l with the insecticide. Insecticide: Dimethoate at 0.34 l.
Potatoes: Weedkillers: Linuron at 0.93 kg with paraquat at 0.28 kg ion in 280 l. Fungicide: Mancozeb at 1.3 kg in 280 l applied six times, with the insecticide on the first and third occasion. Insecticide: Pirimicarb at 0.14 kg.
Subsoiling test section:
W. wheat: Manures: N at 52 kg to seedbed and at 75 kg in spring, as 'Nitro-Chalk'. Weedkillers: Ioxynil at 0.63 kg and mecoprop at 1.9 kg in 220 l. Fungicide: Tridemorph at 0.53 kg in 220 l applied with the pirimicarb. Insecticides: Dimethoate at 0.68 l in 220 l. Pirimicarb at 0.14 kg.

Seed: W. wheat: Hustler, sown at 200 kg.
W. barley: Sonja, sown at 180 kg.
S. barley: Goldmarker, sown at 180 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
Grass section: P & K applied: 12 Feb, 1980. Bone meal and N applied: 25 Mar. Cut: 5 June, 4 Aug. N applied: 17 June.
Arable test crop section:
All crops: P and bone meal applied: 30 Aug, 1979.
W. wheat and w. barley: K applied: 30 Aug, 1979. Seed sown and N applied: 26 Sept. Isoproturon applied: 27 Sept. Ioxynil and mecoprop applied: 25 Mar, 1980. N applied: 31 Mar. Carbendazim and tridemorph applied to w. wheat only: 24 Apr. Carbendazim, zineb, and dimethoate applied to w. wheat only: 18 June. W. barley combine harvested: 29 July. W. wheat combine harvested: 20 Aug.
Potatoes: K applied: 10 Apr, 1980. N applied, potatoes planted: 23 Apr. Weedkillers applied: 29 May. Fungicide applied: 18 June, 25 June, 8 July, 24 July, 20 Aug, 5 Sept. Insecticide applied: 18 June, 8 July. Potatoes lifted: 25 Sept.
Subsoiling test section: Conventional P & K treatment applied: 29 Aug, 1979. Bone meal applied: 30 Aug. W. wheat sown and first N applied: 26 Sept. Weedkiller applied: 31 Mar, 1980. Second N applied: 10 Apr. W. wheat rotary cultivated, s. barley sown: 24 Apr. Dimethoate applied: 29 May. Pirimicarb and tridemorph applied: 25 June. Combine harvested: 14 Sept.

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80/S/RN/1

GRASS

DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

MANURE	1ST CUT(5/6/80)	2ND CUT(4/8/80)	TOTAL OF 2 CUTS
(D)N	6.50	3.91	10.41
BN	6.07	3.73	9.80
(N)P2N	6.49	3.76	10.25
(P)P1N	6.35	4.08	10.43
(K)P2KN	7.07	4.28	11.35
(-)P2N	6.33	4.22	10.56
(PK)P1KN	7.12	4.32	11.44
(NK)P2KN	6.88	4.54	11.42
(NP)P1N	6.15	3.71	9.86
(NPK)P1KN	6.78	4.27	11.05
MEAN	6.57	4.08	10.66
MEAN DM%	31.8	26.1	28.9

PLOT AREA HARVESTED 0.00095

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80/S/RN/1
WINTER WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

POTASH MANURE	0	63	MEAN
(D)P2N	10.64	10.52	10.58
BN	10.03	9.83	9.93
(N)P2N	10.49	9.78	10.13
(P)P1N	9.60	9.70	9.65
(K)P2KN	9.93	10.45	10.19
(-)P2N	10.12	9.75	9.94
(PK)P1KN	9.90	9.96	9.93
(NK)P2KN	9.78	9.93	9.85
(NP)P1N	9.13	9.20	9.17
(NPK)P1KN	9.06	9.26	9.16
MEAN	9.87	9.84	9.85

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	POTASH	MANURE* POTASH
SED	0.150	0.475

* WITHIN THE SAME LEVEL OF MANURE ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.182	1.8
BLOCK.WP.SP	10	0.475	4.8

GRAIN MEAN DM% 85.5

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

POTASH MANURE	0	63	MEAN
(D)P2N	6.04	5.71	5.88
BN	4.13	3.97	4.05
(N)P2N	4.96	4.85	4.91
(P)P1N	3.95	5.09	4.52
(K)P2KN	4.20	5.37	4.78
(-)P2N	4.36	4.41	4.38
(PK)P1KN	5.15	4.59	4.87
(NK)P2KN	5.68	4.65	5.17
(NP)P1N	4.21	3.82	4.01
(NPK)P1KN	3.34	4.66	4.00
MEAN	4.60	4.71	4.66

STRAW MEAN DM% 59.9 SUB PLOT AREA HARVESTED 0.00075

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80/S/RN/1

SPRING BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

POTASH MANURE	0	63	MEAN
(D)P2N	9.12	9.35	9.23
BN	8.95	8.39	8.67
(N)P2N	8.70	9.19	8.95
(P)P1N	8.81	8.60	8.70
(K)P2KN	8.46	8.92	8.69
(-)P2N	8.44	8.13	8.29
(PK)P1KN	8.65	8.56	8.61
(NK)P2KN	8.77	8.61	8.69
(NP)P1N	8.59	8.47	8.53
(NPK)P1KN	8.24	8.54	8.39
MEAN	8.67	8.68	8.68

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	POTASH	MANURE* POTASH
SED	0.132	0.419

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.210	2.4
BLOCK.WP.SP	10	0.419	4.8

GRAIN MEAN DM% 80.2

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

POTASH MANURE	0	63	MEAN
(D)P2N	6.45	6.52	6.49
BN	5.59	5.71	5.65
(N)P2N	4.97	5.11	5.04
(P)P1N	4.85	4.96	4.90
(K)P2KN	5.49	5.32	5.40
(-)P2N	4.64	5.09	4.86
(PK)P1KN	5.32	5.43	5.37
(NK)P2KN	6.09	5.15	5.62
(NP)P1N	4.91	4.58	4.74
(NPK)P1KN	5.11	5.30	5.20
MEAN	5.34	5.32	5.33

STRAW MEAN DM% 51.3 SUB PLOT AREA HARVESTED 0.00075

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80/S/RN/1

POTATOES

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

POTASH MANURE	0	251	MEAN
(D)P2N	39.9	44.8	42.4
BN	27.9	34.6	31.2
(N)P2N	25.8	36.0	30.9
(P)P1N	27.0	36.0	31.5
(K)P2KN	39.8	35.8	37.8
(-)P2N	33.7	38.5	36.1
(PK)P1KN	43.9	40.6	42.2
(NK)P2KN	39.7	40.7	40.2
(NP)P1N	25.9	36.5	31.2
(NPK)P1KN	40.2	41.7	40.9
MEAN	34.4	38.5	36.5

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	POTASH	MANURE* POTASH
SED	1.30	4.11

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	9	2.82	7.7
BLOCK.WP.SP	10	4.11	11.3

PLOT AREA HARVESTED 0.00069

WINTER WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT MANURE	CNVNTIAL	SUBDUG	SUBDUG+F	MEAN
(D)P2N	4.82	5.09	4.88	4.93
BN	3.98	3.97	4.32	4.09
(N)P2N	3.83	4.26	4.22	4.11
(P)P1N	3.35	3.79	3.83	3.66
(K)P2KN	3.64	3.63	3.69	3.66
(-)P2N	4.00	3.86	3.88	3.92
(PK)P1KN	3.60	3.65	3.69	3.65
(NK)P2KN	3.80	3.82	3.97	3.86
(NP)P1N	3.92	3.84	4.08	3.95
(NPK)P1KN	3.82	4.00	4.05	3.96
MEAN	3.88	3.99	4.06	3.98

GRAIN MEAN DM% 83.9 SUB PLOT AREA HARVESTED 0.00230

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80/S/RN/2

ROTATION II

Object: To measure, by crop yields and soil analysis, the residual value of P applied as FYM or superphosphate in the periods 1899-1964 and 1965-1967 and of fresh dressings since - Saxmundham.

Sponsors: G.E.G. Mattingly, A.E. Johnston.

The eleventh year of revised scheme, w. wheat, w. beans.

For previous years see 'Details' 1967 & 1973, and 74-79/S/RN/2.

Whole plot dimensions: 5.49 x 39.8.

Treatments: From 1899-1964 the experiment tested farmyard manure and nitrogen and phosphate fertilisers applied to a rotation of crops. Since 1965 the treatments have been changed to evaluate old residues of P (from FYM and superphosphate) and new residues from treatments applied 1965-1967. All crops of the rotation - potatoes, s. barley, sugar beet, s. barley - were grown until 1974. The whole experiment was sown to s. barley in 1975 and 1976, alternating w. wheat and s. barley from 1977 to 1979, w. beans and w. wheat in 1980. Combinations of the following treatments are tested:

Whole plots

1. RESIDUE — Residues of previous treatments:-

		Approximate total dressing 1899-1964	Total dressing 1965-1967
(0)0	Plot 1	None	None
(D)0	Plot 2	400 tonnes FYM	None
(DP)0	Plot 3	400 tonnes FYM, 2.7 tonnes P205	None
(DP)D2	Plot 4	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM
(DP)D2P1	Plot 5	400 tonnes FYM, 2.7 tonnes P205	100 tonnes FYM, 0.56 tonnes P205
(DP)P1	Plot 6	400 tonnes FYM, 2.7 tonnes P205	0.56 tonnes P205
(DP)P2	Plot 7	400 tonnes FYM, 2.7 tonnes P205	1.13 tonnes P205
(DP52)0	Plot 8	326 tonnes FYM, 4.3 tonnes P205 (until 1952 only)	None

W. beans in 1980 (after w. wheat 1979) tests in addition to 1:-

Sub plots

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80/S/RN/2

2. P Phosphate (total P205 applied in each period (kg)):

	1969-71	1973-75	1978	1980 (to preceding w. wheat stubble)
(0)(0)0	0	0	0	0
(0)(3)0	0	378	0	0
(1)(3)1	126	378	120	120
(2)(3)1	252	378	120	120
(3)(3)0	378	378	0	0

W. wheat in 1980 (after s. barley 1979) tests in addition to 1:

Sub plots

2. P Phosphate (total P205 applied in each period (kg)):

	1969-71	1973-75	1979 (to preceding w. wheat stubble)
(0)(0)0	0	0	0
(0)(3)0	0	378	0
(1)(3)1	126	378	120
(2)(3)1	252	378	120
(3)(3)0	378	378	0

and some of the combinations of 2 with:-

3. N Nitrogen fertiliser (kg N as 'Nitro-Chalk')(in addition to autumn basal N):

40
80
120
160

NOTE: Yields were not taken for w. beans.

Standard applications:
W. wheat: Manures: K_2O at 150 kg as muriate of potash. Weedkillers: Isoproturon at 2.7 kg in 220 l. Ioxynil at 0.63 kg and mecoprop at 1.9 kg in 220 l. Fungicides: Carbendazim at 0.25 kg with zineb at 1.6 kg in 220 l applied with the insecticide. Insecticide: Dimethoate at 0.34 l.
W. beans: Manures: K_2O at 150 kg as muriate of potash. Weedkillers: Simazine at 1.1 kg in 220 l. Fungicide: Benomyl at 0.56 kg in 220 l.

Seed: W. wheat: Hustler, sown at 190 kg.
W. beans: Throws MS, sown at 270 kg.

Cultivations, etc.:-
W. wheat: K applied: 29 Aug, 1979. Ploughed: 30 Oct. Seed sown: 16 Oct. Isoproturon applied: 17 Oct. Ioxynil and mecoprop applied: 31 Mar, 1980. N applied: 10 Apr. Fungicide and insecticide applied: 18 June. Combine harvested: 20 Aug.
W. beans: K applied: 29 Aug, 1979. P applied: 30 Aug. Ploughed: 3 Oct. Seed sown: 16 Oct. Simazine applied: 17 Oct. Fungicide applied: 31 Mar, 1980. Combine harvested: 21 Oct.

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80/S/RN/2

WINTER WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

RESIDUE	N P	40	80	120	160
(0)0	(0)(0)0	4.25	4.68		
(0)0	(0)(3)0			4.55	5.84
(0)0	(1)(3)1		5.88		7.45
(0)0	(2)(3)1	5.55		7.41	
(0)0	(3)(3)0	4.18		7.58	
(D)0	(0)(0)0			6.50	6.02
(D)0	(0)(3)0	5.55	5.83		
(D)0	(1)(3)1	5.45		7.94	
(D)0	(2)(3)1		5.72		9.66
(D)0	(3)(3)0		6.19		7.50
(DP)0	(0)(0)0	5.20	6.54		
(DP)0	(0)(3)0			7.54	7.69
(DP)0	(1)(3)1		6.34		9.31
(DP)0	(2)(3)1	5.71		9.02	
(DP)0	(3)(3)0	5.77		7.16	
(DP)D2	(0)(0)0			8.89	9.57
(DP)D2	(0)(3)0	6.76	6.77		
(DP)D2	(1)(3)1		7.67		8.66
(DP)D2	(2)(3)1	5.25		8.96	
(DP)D2	(3)(3)0	5.00		7.76	
(DP)D2P1	(0)(0)0	6.02	8.24		
(DP)D2P1	(0)(3)0			9.02	10.34
(DP)D2P1	(1)(3)1		7.29		9.96
(DP)D2P1	(2)(3)1		5.81	8.39	
(DP)D2P1	(3)(3)0	6.45		7.59	
(DP)P1	(0)(0)0	5.36	5.77		
(DP)P1	(0)(3)0			8.51	8.24
(DP)P1	(1)(3)1	5.92		7.30	
(DP)P1	(2)(3)1		6.99		9.41
(DP)P1	(3)(3)0		8.00		9.45
(DP)P2	(0)(0)0			8.19	7.95
(DP)P2	(0)(3)0	7.51	7.82		
(DP)P2	(1)(3)1	6.22		6.86	
(DP)P2	(2)(3)1		7.97		8.92
(DP)P2	(3)(3)0		7.44		9.00
(DP52)0	(0)(0)0			7.56	7.05
(DP52)0	(0)(3)0	5.49	6.17		
(DP52)0	(1)(3)1	6.27		7.06	
(DP52)0	(2)(3)1		6.87		9.61
(DP52)0	(3)(3)0		6.97		8.17

GRAIN MEAN DM% 85.7

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80/S/RN/2

WINTER WHEAT

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

RESIDUE	N P	40	80	120	160
(0)0	(0)(0)0	1.31	2.39		
(0)0	(0)(3)0			1.25	1.68
(0)0	(1)(3)1		2.78		3.06
(0)0	(2)(3)1	1.37		3.38	
(0)0	(3)(3)0	1.25		2.43	
(D)0	(0)(0)0			2.89	1.39
(D)0	(0)(3)0	2.60	1.87		
(D)0	(1)(3)1	1.47		2.27	
(D)0	(2)(3)1		2.46		3.25
(D)0	(3)(3)0		2.33		1.68
(DP)0	(0)(0)0	0.83	2.23		
(DP)0	(0)(3)0			2.53	2.63
(DP)0	(1)(3)1		2.35		3.34
(DP)0	(2)(3)1	1.84		3.03	
(DP)0	(3)(3)0	1.64		3.78	
(DP)D2	(0)(0)0			1.94	3.25
(DP)D2	(0)(3)0	2.73	2.04		
(DP)D2	(1)(3)1		2.70		3.29
(DP)D2	(2)(3)1	1.77		3.69	
(DP)D2	(3)(3)0	2.85		2.90	
(DP)D2P1	(0)(0)0	1.47	3.72		
(DP)D2P1	(0)(3)0			1.98	4.21
(DP)D2P1	(1)(3)1		2.25		2.77
(DP)D2P1	(2)(3)1		2.42	2.74	
(DP)D2P1	(3)(3)0	2.84		2.75	
(DP)P1	(0)(0)0	1.86	2.05		
(DP)P1	(0)(3)0			3.57	2.39
(DP)P1	(1)(3)1	1.30		2.53	
(DP)P1	(2)(3)1		3.92		2.27
(DP)P1	(3)(3)0		3.07		1.49
(DP)P2	(0)(0)0			1.40	3.39
(DP)P2	(0)(3)0	2.65	2.52		
(DP)P2	(1)(3)1	1.72		2.10	
(DP)P2	(2)(3)1		3.64		3.25
(DP)P2	(3)(3)0		2.19		1.67
(DP52)0	(0)(0)0			1.12	1.45
(DP52)0	(0)(3)0	3.38	0.86		
(DP52)0	(1)(3)1	2.96		2.26	
(DP52)0	(2)(3)1		1.07		4.29
(DP52)0	(3)(3)0		0.78		2.00

STRAW MEAN DM% 82.2

SUB PLOT AREA HARVESTED 0.00075

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80/R/RN/1 and 80/R/RN/2

LEY ARABLE

Object: To study the effects of three-year leys on the fertility of the soil as measured by a sequence of three arable test crops. From 1968, continuous w. wheat was grown on some blocks after the three test crops to study the build-up and decline of take-all (Gaeumannomyces graminis) after the different cropping sequences. From 1977 new crop sequences were introduced on these blocks - Highfield and Fosters.

Sponsors: A.E. Johnston, D.B. Slope.

The 32nd year, old grass, leys, s. oats, potatoes, sugar beet, s. beans, s. barley, w. wheat.

For previous years see 'Details' 1967 & 1973 and 74-79/R/RN/1&2.

The experiment is duplicated on:-

HIGHFIELD — A site with much organic matter initially (ploughed out from permanent grass) (80/R/RN/1)

FOSTERS — A site with little organic matter initially (80/R/RN/2)

ROTATION — Treatments: The experiment originally tested four six-course rotations, with all phases present each year. In recent years these rotations were:-

	Treatment crops	Test crops
LUCERNE	LU, LU, LU	W, P, B
CLOGRA	LC, LC, LC	W, P, B
GRASS	LN, LN, LN,	W, P, B
ARABLE	H, SB, O,	W, P, B

LU = lucerne, LC = clover-grass ley, no nitrogen fertiliser, LN = all-grass ley with much nitrogen fertiliser, H = 1-year seeds hay, SB = sugar beet, O = s. oats, W = w. wheat, P = potatoes, B = s. barley.

From 1968 the order of test crops was changed to P, W, B except for those phases that had already started the sequence W, P, B.

From 1975 the s. barley test crop was changed to w. wheat.

RESEEDED — On both fields in the first three years other plots were sown with long-term reseeded grass

OLDGRASS — On Highfield plots of the old turf were left initially unploughed, for comparison with the three-year leys

In 1962 and 1963 some of the old and reseeded grass plots were divided for management identical to:-

C — Clover-grass ley
N — All-grass ley

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80/R/RN/1 and 80/R/RN/2

From 1963 (reseeded) and 1968 (old grass) some grass plots were ploughed and cropped with the same test crops as above, thereafter these plots followed the ARABLE rotation. In 1973 some of these plots were returned to reseeded grass.

From 1968 only two phases on each field continued in the original six-course rotation (the museum blocks). The four other phases (the new sequence blocks) were sown to w. wheat every year at the end of the test-crop cycle. In 1977, 1978, 1979 and 1980 one phase, fallowed in the previous year started new sequences of treatment cropping:

SEQUENCE		Treatment crops	Test crops
LUCERNE	(previously LUCERNE)	LU, LU, LU	W, W, W, W
CLOGRA	(previously CLOGRA)	LC, LC, LC	W, W, W, W
GRASS/G	(previously GRASS)	R, R, R	W, W, W, W
ARABLE/A	(previously ARABLE)	O, P, BE	W, W, W, W
ARABLE/R	(previously RESEEDED)	B, B, W	W, W, W, W
GRASS/OG	(previously OLDGRASS)	R, R, R	W, W, W, W

R = ryegrass, BE = s. beans. Other symbols as above. All ploughed at the end of the treatment crop cycle except GRASS/OG - direct drilled to w. wheat. Treatment crop cycles start after nine previous cereals followed by one fallow. In treatment years yields are taken only from s. barley and w. wheat.

Additional treatments to 2nd test crop w. wheat in the museum blocks:-

Sub plots

FYMRES68 Farmyard manure residues, last applied 1968:

NONE None
FYM 30 tonnes on each occasion

Sub plots

N Nitrogen fertiliser in 1980 (kg N as 'Nitro-Chalk'):

0
50
100
150

Additional treatments to 1st test crop w. wheat in the new sequence blocks:

Sub plots

N Nitrogen fertiliser in 1980 (kg N as 'Nitro-Chalk'):

0
50
100
150

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80/R/RN/1 and 80/R/RN/2

Standard applications:
Museum blocks:
2nd Treatment crops:
Lucerne: Manures: (0:14:28) at 810 kg.
All-grass ley and clover-grass ley: Manures: (0:14:28) at 540 kg.
All-grass ley only: Manures: (25:0:16) at 300 kg in spring and after each cut except the last.
Sugar beet: Manures: (13:13:20) at 1260 kg.
2nd Test crop:
Wheat: Manures: (0:20:20) at 250 kg, combine drilled.
Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.
Reseeded grass and Old grass: Manures: (0:14:28) at 540 kg.
All-grass half plots: Manures: (25:0:16) at 300 kg in spring and after each cut except the last.

New sequence blocks:
1st Treatment crops:
All crops: Manures: Chalk at 8.7 t, Highfield. Chalk at 5.8 t to all crops on Fosters except ryegrass which received 8.7 t.
Lucerne: Manures: (0:14:28) at 720 kg.
Clover-grass ley: Manures: (0:14:28) at 720 kg. (25:0:16) at 300 kg applied once when clover established.
Ryegrass: Manures: (0:14:28) at 720 kg. (25:0:16) to seedbed and after each productive cut except the last.
S. oats and s. barley: Manures: (20:10:10) at 350 kg, combine drilled. Weedkiller: Mecoprop at 2.7 kg in 900 l applied with the fungicide. Fungicide: Tridemorph at 0.53 kg.
2nd Treatment crops:
Lucerne: Manures: (0:14:28) at 720 kg.
Clover-grass ley and ryegrass: Manures: (0:14:28) at 720 kg. (25:0:16) at 300 kg in spring, and, to ryegrass only, after each cut except the last.
Potatoes: Manures: (13:13:20) at 1500 kg. Weedkiller: Linuron at 1.1 kg in 900 l. Fungicide: Mancozeb at 1.4 kg in 250 l applied six times, with the pirimicarb on the first five occasions. Insecticides: Phorate at 1.7 kg with the seed. Pirimicarb at 0.14 kg.
S. barley: Manures: (20:10:10) at 350 kg. Weedkiller: Mecoprop at 2.7 kg in 900 l applied with the fungicide. Fungicide: Tridemorph at 0.53 kg.
3rd Treatment crops:
Lucerne: Manures: (0:14:28) at 720 kg.
Clover-grass ley and ryegrass: Manures: (0:14:28) at 720 kg. (25:0:16) at 300 kg in spring, and, to ryegrass only, after each cut except the last.
S. beans: None.
W. wheat: Manures: (0:20:20) at 250 kg, combine drilled. 'Nitro-Chalk' at 390 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.
1st Test crops:
W. wheat:
After all sequences: Manures: (0:20:20) at 250 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.
After GRASS/OG: Weedkillers: Paraquat at 0.84 kg ion in 220 l. Glyphosate at 1.5 kg in 220 l.

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80/R/RN/1 and 80/R/RN/2

Seed:
- Museum blocks:
  - Sugar beet: Bush Mono G, sown at 5.6 kg.
  - Wheat: Flanders, sown at 200 kg.
- New sequence blocks:
  - Lucerne: Vertus, sown at 28 kg.
  - Clover-grass ley: S215 meadow fescue at 15 kg, climax timothy at 17 kg, Huia white clover at 4 kg. Mixture sown at 36 kg.
  - Ryegrass: S24 perennial ryegrass, sown at 22 kg.
  - Oats: Manod, sown at 200 kg.
  - Barley: Georgie, sown at 160 kg.
  - Potatoes: Pentland Crown.
  - Beans: Minden, sown at 180 kg.
  - Wheat: Flanders, sown at 200 kg.

Cultivations, etc.:-
- Museum blocks:
  - 2nd Treatment crops:
    - Lucerne: PK applied: 20 Nov, 1979. Cut: 2 June, 1980, 23 July, 3 Nov.
    - Clover-grass ley and all-grass ley: PK applied: 20 Nov, 1979. NK applied (to all-grass ley only): 11 Mar, 1980, 3 June, 29 July. Cut: 28 May, 21 July, 24 Oct.
    - Sugar beet: Ploughed: 23 Nov, 1979. Disc harrowed: 12 Apr, 1980. NPK applied, rotary harrowed, seed sown: 15 Apr. Tractor hoed: 21 May, 9 June. Singled: 3 June. Hand harvested: 6 Nov.
  - 2nd Test crops:
    - W. wheat: Heavy spring-tine cultivated, seed sown: 19 Oct, 1979. Test N applied: 11 Apr, 1980. Weedkillers applied: 16 Apr. Combine harvested: 21 Aug.
    - Reseeded grass and old grass: PK applied: 20 Nov, 1979. NK applied to all grass half-plots only: 11 Mar, 1980, 3 June, 29 July. Cut: 28 May, 21 July, 24 Oct.
- New sequence blocks:
  - 1st Treatment crops:
    - All crops: Chalk applied: 3 Jan, 1980 (Highfield), 11 Jan (Fosters).
    - Lucerne and Clover-grass ley: Chisel ploughed twice: 18 Jan, 1980 (Highfield). Chisel ploughed once: 25 Jan (Fosters). Spring-tine cultivated, PK applied, rotary harrowed, seed sown: 21 Apr. NK applied: 4 July (Clover-grass ley only). Cut: 25 July, 24 Oct.
    - Ryegrass: Chisel ploughed: 18 Jan, 1980 (Highfield), 25 Jan (Fosters). Spring-tine cultivated, PK applied, rotary harrowed, seed sown: 21 Apr. Topped: 25 July, 24 Oct.
    - S. oats and s. barley: Chisel ploughed: 18 Jan, 1980 (Highfield), 25 Jan (Fosters). Rotary harrowed: 6 Mar (s. barley on Highfield only). Rotary harrowed, seed sown: 9 Apr. Weedkiller and fungicide applied: 30 May. Combine harvested: 1 Sept, (s. barley, Fosters only), 2 Sept, (remaining crops).
  - 2nd Treatment crops:
    - All forage crops: PK applied: 20 Nov, 1979.
    - Lucerne: Cut: 4 June, 1980, 23 July, 24 Oct.
    - Clover-grass ley, and ryegrass: NK applied: 11 Mar, 1980. Cut: 29 May, 23 July, 24 Oct. NK applied (to ryegrass only): 3 June, 29 July.

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80/R/RN/1 and 80/R/RN/2

Potatoes: Ploughed: 22 Nov, 1979. Spring-tine cultivated, NPK applied: 17 Apr, 1980. Rotary harrowed, seed planted: 18 Apr. Grubbed: 25 Apr. Rotary ridged: 26 Apr, (Fosters), 29 Apr, (Highfield). Weedkillers applied: 19 May. Fungicide applied: 18 June, 30 June, 11 July, 24 July, 5 Aug, 18 Aug with pirimicarb on the first five occasions. Haulm mechanically destroyed: 2 Sept. Lifted: 8 Oct.

S. barley: Ploughed: 21 Nov, 1979. Rotary harrowed (Highfield only): 6 Mar, 1980. Rotary harrowed, seed sown: 9 Apr. Weedkiller and fungicide applied: 30 May. Combine harvested: 1 Sept.

3rd Treatment crops:

All forage crops: PK applied: 20 Nov, 1979.

Lucerne: Cut: 4 June, 1980, 23 July. Topped: 5 Aug.

Clover-grass ley and ryegrass: NK applied: 11 Mar, 1980, 3 June (to ryegrass only). Cut: 29 May, 23 July. Topped (except GRASS/OG): 5 Aug.

S. beans: Heavy spring-tine cultivated: 19 Oct, 1979. Rotary harrowed, seed sown: 5 Mar, 1980. Tractor hoed: 21 May, 9 June. Combine harvested: 17 Sept.

W. wheat: Ploughed: 12 Oct, 1979. Rotary harrowed, seed sown: 18 Oct. N applied: 11 Apr, 1980. Weedkillers applied: 16 Apr. Combine harvested: 21 Aug.

1st Test crop:

W. wheat:

After lucerne, clover-grass ley and ryegrass (except GRASS/OG): Ploughed: 20 Aug, 1979. Spring-tine cultivated: 3 Oct. Rotary harrowed: 16 Oct. Seed sown: 18 Oct.

After GRASS/OG: Paraquat applied: 22 Aug, 1979. Glyphosate applied: 27 Sept. Seed direct drilled and disc harrowed in: 18 Oct.

After w. wheat and s. beans: Ploughed: 12 Oct, 1979. Rotary harrowed: 16 Oct. Seed sown: 18 Oct.

Subsequent operations to all sequences: Test N applied: 11 Apr, 1980. Weedkillers applied: 16 Apr. Combine harvested: 21 Aug.

NOTE: In July w. wheat and s. barley on the new sequence blocks were sampled for take-all and Phialophora.

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80/R/RN/1 AND 80/R/RN/2

MUSEUM BLOCKS

DRY MATTER: TONNES/HECTARE

***** TABLES OF MEANS *****

	HIGHFIELD	FOSTERS
CLOVER-GRASS LEY		
TOTAL OF 3 CUTS	5.92	7.84
MEAN DM%	24.2	22.0
ALL GRASS LEY		
TOTAL OF 3 CUTS	13.76	11.74
MEAN DM%	22.1	23.7
LUCERNE		
TOTAL OF 3 CUTS	12.0	11.7
MEAN DM%	25.5	23.1

OLD GRASS

TOTAL OF 3 CUTS

	HIGHFIELD	
	C	N
32ND EXPTL YEAR		
BLOCKS 1 & 4	4.61	9.74
BLOCK 2	3.87	10.24
MEAN DM%	25.5	22.3

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80/R/RN/1 AND 80/R/RN/2

RESEEDED GRASS

TOTAL OF 3 CUTS

		HIGHFIELD			FOSTERS	
	BLOCKS	C	N	BLOCKS	C	N
32ND EXPTL YEAR	1 & 4	4.99	10.52	1 & 3	6.66	10.61
32ND EXPTL YEAR (SEEDED 1949 RESEEDED 1973)	2 & 3	5.40	10.77	2 & 4	4.73	9.74
MEAN DM%		24.0	23.2		21.7	23.0

NEW SEQUENCE BLOCKS

***** TABLES OF MEANS *****

BARLEY — GRAIN TONNES/HECTARE

	HIGHFIELD	FOSTERS
	6.88	6.09
MEAN DM%	82.2	82.3

SUGAR BEET

	HIGHFIELD	FOSTERS
	MEAN	MEAN
ROOTS (WASHED):	TONNES/HECTARE	
	37.7	39.8
	SUGAR PERCENTAGE	
	16.9	17.6
	TOTAL SUGAR: TONNES/HECTARE	
	6.38	7.00
	TOPS: TONNES/HECTARE	
	38.2	32.5

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80/R/RN/1 HIGHFIELD

WINTER WHEAT 1ST TEST CROP

NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	50	100	150	MEAN
SEQUENCE					
LUCERNE	6.37	7.09	7.31	7.92	7.17
CLOGRA	3.91	4.75	6.48	6.84	5.50
GRASS/G	3.60	5.70	6.67	7.30	5.82
ARABLE/A	4.61	7.06	7.37	8.28	6.83
ARABLE/R	4.42	6.16	6.73	7.58	6.22
GRASS/OG	3.67	5.40	6.37	6.52	5.49
MEAN	4.43	6.03	6.82	7.41	6.17

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.393	0.174	0.539
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEQUENCE			0.427

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.393	6.4
BLOCK.WP.SP	18	0.427	6.9

GRAIN MEAN DM% 82.9

SUB PLOT AREA HARVESTED 0.00322

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80/R/RN/1 HIGHFIELD

WINTER WHEAT 2ND TEST CROP

MUSEUM BLOCKS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FYMRES68	NONE	FYM	MEAN
ROTATION			
LUCERNE	6.56	6.43	6.49
CLOGRA	6.82	7.60	7.21
GRASS	6.30	6.59	6.44
ARABLE	6.10	6.08	6.09
MEAN	6.44	6.67	6.56

N	0	50	100	150	MEAN
ROTATION					
LUCERNE	4.68	6.21	7.30	7.79	6.49
CLOGRA	5.10	6.84	8.03	8.87	7.21
GRASS	4.24	6.28	7.29	7.96	6.44
ARABLE	3.13	5.44	7.31	8.47	6.09
MEAN	4.29	6.19	7.48	8.27	6.56

N	0	50	100	150	MEAN
FYMRES68					
NONE	4.04	6.23	7.32	8.19	6.44
FYM	4.54	6.16	7.65	8.35	6.67
MEAN	4.29	6.19	7.48	8.27	6.56

N		0	50	100	150
FYMRES68	ROTATION				
NONE	LUCERNE	4.31	7.01	6.78	8.15
	CLOGRA	4.43	6.35	7.92	8.60
	GRASS	4.73	5.53	7.57	7.36
	ARABLE	2.69	6.03	7.00	8.67
FYM	LUCERNE	5.05	5.41	7.81	7.43
	CLOGRA	5.78	7.34	8.15	9.14
	GRASS	3.75	7.03	7.00	8.56
	ARABLE	3.57	4.85	7.63	8.27

GRAIN MEAN DM% 82.7

PLOT AREA HARVESTED 0.00663

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80/R/RN/2 FOSTERS

WINTER WHEAT 1ST TEST CROP

NEW SEQUENCE BLOCKS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N SEQUENCE	0	50	100	150	MEAN
LUCERNE	5.47	6.96	7.78	7.77	7.00
CLOGRA	5.58	6.97	7.51	7.93	7.00
GRASS/G	3.30	4.82	6.23	6.88	5.30
ARABLE/A	3.68	4.60	5.86	6.87	5.25
ARABLE/R	3.40	3.92	4.89	6.03	4.56
MEAN	4.29	5.46	6.45	7.09	5.82

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEQUENCE	N	SEQUENCE N
SED	0.297	0.177	0.453
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEQUENCE			0.395

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.297	5.1
BLOCK.WP.SP	15	0.395	6.8

GRAIN MEAN DM% 81.7

SUB PLOT AREA HARVESTED 0.00322

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80/R/RN/2 FOSTERS

WINTER WHEAT 2ND TEST CROP

MUSEUM BLOCKS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

ROTATION	LUCERNE	CLOGRA	GRASS	ARABLE	MEAN
FYMRES68					
NONE	7.25	7.52	6.68	6.26	6.93
FYM	7.48	7.76	6.68	6.07	7.00
MEAN	7.36	7.64	6.68	6.17	6.96

N	0	50	100	150	MEAN
FYMRES68					
NONE	4.63	6.96	7.55	8.58	6.93
FYM	4.54	6.86	7.95	8.63	7.00
MEAN	4.59	6.91	7.75	8.61	6.96

N	0	50	100	150	MEAN
ROTATION					
LUCERNE	5.20	7.23	7.80	9.22	7.36
CLOGRA	5.26	8.17	8.56	8.58	7.64
GRASS	4.48	6.51	7.36	8.37	6.68
ARABLE	3.40	5.73	7.28	8.25	6.17
MEAN	4.59	6.91	7.75	8.61	6.96

N	0	50	100	150
FYMRES68 ROTATION				
NONE LUCERNE	5.50	6.74	7.68	9.08
CLOGRA	4.92	8.43	8.17	8.56
GRASS	4.67	6.67	7.28	8.11
ARABLE	3.42	5.98	7.07	8.57
FYM LUCERNE	4.91	7.71	7.93	9.37
CLOGRA	5.60	7.91	8.95	8.60
GRASS	4.29	6.34	7.43	8.64
ARABLE	3.38	5.47	7.50	7.93

GRAIN MEAN DM% 80.8

PLOT AREA HARVESTED 0.00663

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80/W/RN/3

LEY/ARABLE

Object: To compare the effects on soil fertility of rotations with or without leys - Woburn Stackyard D.

Sponsors: A.E. Johnston, G.A. Salt.

The 43rd year, leys, s. barley, s. oats, w. wheat.

For previous years see 'Details' 1967 & 1973 and 74-79/W/RN/3.

Design: 5 series of 8 plots, split for treatments other than rotations.

Whole plot dimensions: 8.53 x 40.7.

Treatments: All phases of four five-course rotations were originally present:

ROTATION

LEY	Clover/grass ley:	L, L, L, P, W
CLO	All legume ley:	SA, SA, SA, P, W until 1971 then CL, CL, CL, P, W
A	Arable with roots:	P, R, C, P, W until 1971 then P, B, B, P, W
A H	Arable with hay:	P, R, H, P, W until 1971 then P, B, H, P, W

P = potatoes, R = w. rye, C = carrots, W = w. wheat, B = s. barley, H = hay, L = clover/grass ley, SA = sainfoin ley, CL = red clover ley

Rotations themselves followed different cycles:

On four plots in each block the rotations were repeated

On four plots in each block arable rotations alternated each five years with ley rotations (ALT)

From 1976 all the rotations were changed on all phases except for the first and second test crops in 1976:

LN 3	(Previous LEY) LN, LN, LN, W, B
LC 3	(Previous CLO) LC, LC, LC, W, B
AF	(Previous A) F, F, O, W, B
AB	(Previous A H) B, B, O, W, B

LN = grass ley with N, LC = clover/grass ley no N, O = oats, F = fallow

Plots hitherto in alternating rotations were changed to test eight-year leys:

ALT LN	LN, LN, LN, LN, LN, LN, LN, LN, W, B
ALT LC	LC, LC, LC, LC, LC, LC, LC, LC, W, B

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The new scheme started by sowing these new leys in spring 1976 on four phases and in spring 1977 on the fifth phase (2nd test crop in 1976). Initially some of the long term leys are ploughed up in less than eight years ALT LN, ALT LC, depending on the starting point in relation to the test crop, to ensure that ultimately eight-year leys will be available for each test crop period.

Yields are taken only from the test crops.

Treatments to first test crop w. wheat, all combinations of:

1. ROTATION — Rotations:

   ALT LN 3
   LN 3
   ALT LC 3
   LC 3
   AF
   AB

   1/2 plots

2. FYMRES64 — Farmyard manure residues, last applied 1964:

   NONE — None
   FYM — 38 tonnes on each occasion

1/8 plots

3. N — Nitrogen fertiliser (kg N):

   0
   63
   126
   189

Treatments to second test crop s. barley, all combinations of:

whole plots

1. ROTATION — Rotations:

   ALT LN 3
   LN 3
   ALT LC 3
   LC 3
   AF
   AB

1/2 plots

2. FYMRES63 — Farmyard manure residues, last applied 1963:

   NONE — None
   FYM — 38 tonnes on each occasion

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80/W/RN/3

1/8 plots

3. N Nitrogen fertiliser (kg N):

0
50
100
150

Corrective K dressings (kg K_2O) as muriate of potash, applied to first test crop w. wheat and long-term leys in the wheat block:

Continuous rotations	No FYM half plots	FYM half plots
LN	138	113
LC	0	0
AF	326	289
AB	251	276
Ex-alternating rotations		
ALT LN ploughed for w. wheat	38	75
ALT LN not ploughed	50	63
ALT LC ploughed for w. wheat	113	13
ALT LC not ploughed	75	0

Standard applications:-

Grass ley and Clover/grass ley, 1st year: Manures: (0:14:28) at 540 kg. N at 75 kg as 'Nitro-Chalk' to grass ley only. Weedkillers: Paraquat at 0.84 kg ion in 450 l. Mecoprop at 2.5 l in 280 l to grass ley only.

Grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Magnesian limestone at 5 t to 5th year only. (0:14:28) at 540 kg. (25:0:16) at 300 kg in spring and after the first cut.

Clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Manures: Magnesian limestone at 5 t to 5th year only, (0:14:28) at 540 kg. K_2O at 48 kg in spring and after the first cut.

S. barley, 1st and 2nd treatment crops: (20:10:10) at 400 kg, combine drilled. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l. Fungicides: Tridemorph at 0.53 kg in 280 l. Ethirimol (as 'Milgo E' at 1.3 l) in 280 l.

S. oats: 3rd treatment crop: (20:10:10) at 400 kg, combine drilled. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l.

W. wheat: 1st test crop: (0:20:20) at 310 kg, combine drilled. Weedkiller: Chlortoluron 3.6 kg in 250 l. Nematicide: Aldicarb at 10 kg.

S. barley: 2nd test crop: (0:20:20) at 300 kg, combine drilled. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l. Fungicides: Tridemorph at 0.53 kg in 280 l. Ethirimol (as 'Milgo E' at 1.3 l) in 280 l. Nematicide: Aldicarb at 10 kg.

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80/W/RN/3

Varieties: Grass ley: Climax timothy at 17 kg, meadow fescue at 17 kg, mixture sown at 34 kg.
Clover/grass ley: Climax timothy at 18 kg, meadow fescue at 15 kg, Huia white clover at 4 kg, mixture sown at 37 kg.
S. barley: Georgie, dressed with ethirimol, sown at 160 kg.
S. oats: Manod, sown at 170 kg.
W. wheat: Flanders, sown at 200 kg.

Cultivations, etc.:- Treatment crops:

Grass ley and clover/grass ley, 1st year: Ploughed: 8 Nov, 1979. Heavy spring-tine cultivated: 29 Feb, 1980. Spring-tine cultivated with crumbler attached: 3 Mar, 16 Apr. PK applied, N applied to grass ley only, seeds sown: 17 Apr. Topped: 9 June. Paraquat applied because of poor germination: 26 June. Rotary cultivated, spring-tine cultivated with crumbler attached: 30 June-2 July. Spring-tine cultivated with crumbler attached, seeds resown: 11 July. Mecoprop applied to grass ley only: 18 Aug. Topped: 9 Sept.

Grass ley and clover/grass ley, 2nd, 3rd, 4th, 5th, 6th, 7th and 8th years: Magnesian limestone applied to 5th year only: 31 Oct, 1979. PK applied: 14 Jan, 1980. Corrective K applied to 4th year only: 28 Feb. NK applied to grass ley, K applied to clover/grass ley: 11 Mar, 31 July. 3rd and 8th year cut 23 July, 8 Sept. Remainder cut: 23 July, 18 Sept.

S. barley: 1st and 2nd treatment crops: Ploughed: 8 Nov, 1979. Heavy spring-tine cultivated: 29 Feb. Spring-tine cultivated with crumbler attached: 3 Mar. Seed sown: 4 Mar. Weedkiller applied: 8 May. Tridemorph applied: 13 May. Ethirimol applied: 5 June. Combine harvested: 20 Aug.

S. oats: 3rd treatment crop: Ploughed after barley: 8 Nov, 1979. Ploughed after fallow: 29 Nov. Heavy spring-tine cultivated: 29 Feb, 1980. Spring-tine cultivated with crumbler attached, seed sown: 24 Mar. Weedkiller applied: 8 May. Combine harvested: 28 Aug.

Fallow: 1st and 2nd treatment years: Ploughed: 8 Nov, 1979. Heavy spring-tine cultivated: 29 Feb, 1980, 7 Aug. Spring-tine cultivated with crumbler attached, 1st year only: 3 Mar, 16 Apr. Rotary cultivated: 29 July.

Test Crops:

W. wheat, 1st test crop: Ploughed after ley: 14 Aug, 1979. Ploughed after oats: 17 Sept. Corrective K applied: 4 Oct. Aldicarb applied, rotary cultivated, seed sown: 6 Oct. Weedkiller applied: 9 Oct. N applied: 14 Apr, 1980. Combine harvested: 26 Aug.

S. barley, 2nd test crop: Paraquat applied: 15 Sept, 1979. Magnesian limestone applied: 31 Oct. Ploughed: 8 Nov. Heavy spring-tine cultivated: 29 Feb, 1980. Aldicarb applied, rotary cultivated, seed sown: 4 Mar. N applied: 24 Mar. Weedkillers applied: 8 May. Tridemorph applied: 13 May. Ethirimol applied: 5 June. Combine harvested: 20 Aug.

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80/W/RN/3

BARLEY 2ND TEST CROP

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FYMRES63	NONE	FYM	MEAN
ROTATION			
ALT LN 3	6.33	6.35	6.34
LN 3	6.84	6.78	6.81
ALT LC 3	6.90	7.00	6.95
LC 3	6.82	6.91	6.86
AF	4.90	5.06	4.98
AB	4.17	4.65	4.41
MEAN	5.99	6.12	6.06

N	0	50	100	150	MEAN
ROTATION					
ALT LN 3	3.95	6.11	7.32	7.97	6.34
LN 3	4.91	6.95	7.69	7.69	6.81
ALT LC 3	4.70	6.71	8.20	8.19	6.95
LC 3	4.54	6.68	8.00	8.24	6.86
AF	1.86	4.28	6.50	7.28	4.98
AB	2.29	4.08	5.12	6.14	4.41
MEAN	3.71	5.80	7.14	7.59	6.06

N	0	50	100	150	MEAN
FYMRES63					
NONE	3.65	5.79	6.93	7.61	5.99
FYM	3.77	5.82	7.35	7.56	6.12
MEAN	3.71	5.80	7.14	7.59	6.06

N		0	50	100	150
ROTATION	FYMRES63				
ALT LN 3	NONE	3.98	6.07	7.32	7.94
	FYM	3.92	6.16	7.32	8.01
LN 3	NONE	5.11	7.01	7.26	7.98
	FYM	4.71	6.89	8.12	7.41
ALT LC 3	NONE	4.67	6.80	8.12	8.01
	FYM	4.72	6.63	8.28	8.37
LC 3	NONE	4.41	6.85	7.69	8.32
	FYM	4.67	6.50	8.30	8.16
AF	NONE	1.58	4.07	6.34	7.62
	FYM	2.15	4.50	6.66	6.94
AB	NONE	2.15	3.93	4.81	5.79
	FYM	2.44	4.22	5.43	6.49

GRAIN MEAN DM% 82.1

PLOT AREA HARVESTED 0.00260

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80/W/RN/3

WINTER WHEAT 1ST TEST CROP

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FYMRES64	NONE	FYM	MEAN
ROTATION			
ALT LN 3	6.00	6.54	6.27
LN 3	5.53	5.47	5.50
ALT LC 3	6.64	7.15	6.89
LC 3	6.84	6.98	6.91
AF	4.80	4.46	4.63
AB	5.13	4.92	5.02
MEAN	5.82	5.92	5.87

N	0	63	126	189	MEAN
ROTATION					
ALT LN 3	3.70	6.54	7.45	7.39	6.27
LN 3	2.99	5.59	6.62	6.79	5.50
ALT LC 3	4.19	7.24	8.00	8.15	6.89
LC 3	4.72	7.44	7.69	7.79	6.91
AF	1.41	4.64	6.15	6.32	4.63
AB	2.22	5.12	6.23	6.52	5.02
MEAN	3.21	6.10	7.02	7.16	5.87

N	0	63	126	189	MEAN
FYMRES64					
NONE	3.06	6.01	6.90	7.32	5.82
FYM	3.36	6.18	7.15	7.00	5.92
MEAN	3.21	6.10	7.02	7.16	5.87

N		0	63	126	189
ROTATION	FYMRES64				
ALT LN 3	NONE	3.25	6.14	7.41	7.22
	FYM	4.16	6.95	7.48	7.56
LN 3	NONE	2.85	5.76	6.46	7.03
	FYM	3.13	5.42	6.78	6.55
ALT LC 3	NONE	3.93	6.69	7.92	8.00
	FYM	4.46	7.79	8.07	8.30
LC 3	NONE	5.08	7.42	7.27	7.59
	FYM	4.37	7.46	8.11	7.98
AF	NONE	1.13	4.85	6.15	7.08
	FYM	1.69	4.43	6.16	5.57
AB	NONE	2.09	5.22	6.18	7.01
	FYM	2.34	5.02	6.28	6.02

GRAIN MEAN DM% 84.2

PLOT AREA HARVESTED 0.00260

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80/W/RN/4

MARKET GARDEN

Object: To study the residual effects of fertilisers and organic manures applied in the period 1942-67 - Woburn Lansome I.

Sponsor: A.E. Johnston.

The 39th year, ryegrass.

For previous years see 'Details' 1967 & 1973 and 74-79/W/RN/4.

Design: 2 series each of 40 plots divided into 4 blocks of 10 plots. Series B has the plots split into 2.

Whole plot dimensions: 8.53 x 5.18.

NOTE: Yields were not taken and no new treatments were applied.

Basal applications: Manures: Chalk at 2.5 t, 80 kg N in spring and after each cut except the last.

Seed: RvP Italian ryegrass at 40 kg, sown 1974.

Cultivations, etc.:- Both series.
Chalk applied: 12 Nov, 1979. N applied: 13 Mar, 1980, 18 June, 30 July.
Cut: 4 June, 23 July, 8 Sept.

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80/R/RN/5

ARABLE REFERENCE PLOTS

Object: To study the long term effects of FYM and N, P and K fertilisers on the yield and mineral content of crops - Great Field IV.

Sponsor: F.V. Widdowson.

The 25th year of the rotation, s. barley, ley, potatoes, w. wheat, kale. The 21st year of a rotation on the additional plots (as above for 20 years; w. barley, ley, potatoes, w. wheat, w. oats in 1980). The 24th year of permanent grass.

For previous years see 58/Bc/1(t), 59/Bc/1(t), 60/B/3(t), 61-64/B/2, 65/B/2(t), 66/B/2(t), 67/B/2, 68/B/3(t) and 69-79/R/RN/5.

Design: 1 block of 12 plots for each crop on original plots. 1 block of 7 plots for each crop on additional plots.

Whole plot dimensions: 2.13 x 2.44.

Treatments: Fertilisers and farmyard manure:

MANURE

Original plots

0
N1
P
N1P
K
N1K
PK
N1PK
N2PK
D
N1PKD
N2PKD

N1, 2 (kg N): 19, 38 (ley): 56, 112 (s. barley): 75, 150 (w. wheat): 125, 250 (potatoes - 75, 150 until 1975): 125, 250 (kale and permanent grass) as 'Nitro- Chalk'

P: 63 kg P_2O_5 as superphosphate

K: 250 kg K_2O as muriate of potash

D: 38 tonnes FYM (permanent grass): 50 tonnes (kale and potatoes): none to other crops.

NOTE: Since 1977 all w. wheat on these plots receives a standard dressing of 82 kg MgO as Epsom salts. Before 1976 potatoes tested 0 v 82 kg MgO on sub plots, dressing balanced-up after harvest before w. wheat.

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80/R/RN/5

Additional plots

MANURE	Fertilisers in 1980 and in previous years:
1980	Until 1979
0	0
N2PK	N2 PK
N2PKMG	N2 PK MG CA
N2PKS	N2 PK CA S
N2PKMGS	N2 PK MG S
N1PKMGS	N2 PK CA MG S
N3PKMGS	N2 PK CA MG S TE

N: In 1980: N1: 20 kg (ley), 80 kg (w. wheat & w. barley), 90 kg (w. oats) 160 kg (potatoes). N2: 30 kg (ley), 120 kg (w. wheat & w. barley), 130 kg (w. oats), 240 kg (potatoes). N3: 40 kg (ley), 160 kg (w. wheat & w. barley), 170 kg (w. oats), 320 kg (potatoes). Until 1979 N2 = larger rate on original plots. As urea in all years.
P: 126 kg P205 as potassium dihydrogen phosphate
K: 251 kg K20 total. As potassium dihydrogen phosphate (83 kg K20) on all PK plots. In addition plots without S receive 168 kg K20 as potassium chloride, plots with S receive 92 kg K20 as potassium sulphate plus 76 kg K20 as potassium chloride. Since 1978 all PK plots receive in addition to the standard total 126 kg K20 for potatoes, applied in autumn as potassium chloride.
MG: 126 kg MgO as magnesium chloride
CA: 126 kg CaO as calcium carbonate until 1979. In 1980 plots not previously given CA received calcium carbonate at 7.5 t, except 0 which was given 5 t.
S: 30 kg S supplied by potassium sulphate
TE: Trace element mixture which included Mn, Cu, Zn, B, Mo, Ca & Fe.

NOTES: (1) For all rates of N to w. oats 50 kg N of the total dressing was applied to the seedbed.
(2) For all rates of N to w. wheat and w. barley 40 kg N of the total dressing was applied in February, the remainder in April.
(3) N dressings to potatoes were divided equally between seedbed and June.

Standard applications:

S. barley: Weedkillers: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l. Insecticide: Pirimicarb at 0.14 kg in 280 l.

W. barley: Weedkillers: Ioxynil at 0.42 kg and mecoprop at 1.3 kg in 280 l. Ioxynil at 0.32 kg and mecoprop at 0.98 kg in 280 l applied with benomyl. Fungicides: Tridemorph at 0.53 kg in 280 l applied twice, with carbendazim on the second occasion. Benomyl at 0.28 kg. Carbendazim (as 'Bavistin' at 0.51 kg). Insecticide: Pirimicarb at 0.14 kg in 280 l.

Potatoes: Weedkillers: Linuron at 0.93 kg in 280 l with paraquat at 0.28 kg ion. Fungicide: Mancozeb at 1.3 kg in 280 l applied three times with insecticide. Insecticide: Pirimicarb at 0.14 kg.

W. wheat: Weedkillers: Ioxynil at 0.32 kg and mecoprop at 0.98 kg in 280 l applied twice with benomyl on the second occasion. Fungicides: Tridemorph at 0.53 kg in 280 l applied twice with carbendazim on the second occasion. Benomyl at 0.28 kg. Carbendazim (as 'Bavistin' at 0.51 kg). Carbendazim with maneb and tridemorph (as 'Cosmic' at 3.9 kg) and captafol at 1.1 kg in 280 l with insecticide. Insecticide: Pirimicarb at 0.14 kg.

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W. oats: Weedkillers: Ioxynil at 0.32 kg and mecoprop at 0.98 kg in 280 l applied twice, with benomyl on the second occasion. Fungicides: Tridemorph at 0.53 kg in 280 l applied twice, with carbendazim on the second occasion. Benomyl at 0.28 kg. Carbendazim (as 'Bavistin' at 0.51 kg). Insecticide: Pirimicarb on 0.14 kg in 280 l.

Seed: S. barley: Minak, sown at 200 kg.
W. barley: Sonja, sown at 200 kg.
Grass-clover ley: RvP Italian ryegrass and Hungaropoly red clover.
Potatoes: Pentland Crown.
W. wheat: Virtue, sown at 200 kg.
Kale: Thousand Head, sown at 4.5 kg.
W. oats: Pennal, sown at 200 kg.

Cultivations, etc.:-
S. barley: Dug by hand: 12 Oct, 1979. P & K applied, rotary cultivated, raked by hand, seed sown: 19 Feb, 1980. N applied: 2 Apr. Weedkillers applied: 2 May. Insecticide applied: 9 June. Harvested by hand: 18 Aug.
W. barley: Dug by hand: P, K, Mg & S applied: 12 Oct, 1979. Raked by hand, seed sown: 15 Oct. First weedkillers applied: 23 Nov. First tridemorph applied: 19 Dec. First part N applied to additional plots: 19 Feb, 1980. Second weedkillers, and benomyl applied: 2 Apr. Remaining N applied: 11 Apr. Carbendazim and second tridemorph applied: 29 Apr. Pirimicarb applied: 9 June. Harvested by hand: 18 Aug.
Grass-clover ley: Grass direct drilled between rows of barley stubble, clover broadcast: 31 Aug, 1979. P, K, Mg and S applied: 28 Nov. N applied: 29 Feb, 1980. Cut: 22 May, 10 July, 14 Aug, 14 Oct.
Potatoes: FYM applied and dug by hand: 23 Oct, 1979. P & K applied: 29 Feb, 1980. N applied, (first half on additional plots) rotary cultivated twice, potatoes planted: 21 Apr. Weedkillers applied: 22 May. Second half N applied to additional plots: 9 June. Fungicide and insecticide applied: 3 July, 23 July and 7 Aug. Plots given neither K nor FYM harvested by hand: 14 Aug. Remaining plots harvested by hand: 17 Sept.
W. wheat: Dug by hand: 25 Sept, 1979. P, K, S and Mg applied: 26 Sept. Plots raked by hand, seed sown: 27 Sept. Weedkiller applied: 23 Nov. Tridemorph applied: 19 Dec. First part N applied to additional plots: 19 Feb, 1980. Remaining N applied, weedkillers plus benomyl applied: 2 Apr. Carbendazim and tridemorph applied: 29 Apr. Pirimicarb applied: 9 June. 'Cosmic', captafol and pirimicarb applied: 10 July. Harvested by hand: 18 Aug.
Kale: FYM applied and dug by hand: 15 Oct, 1979. PK applied: 29 Feb, 1980. N applied, rotary cultivated, raked by hand, seed sown: 22 Apr. Harvested by hand: 23 Sept.
W. oats: Dug by hand: 5 Sept, 1979. P, K, Mg and S applied: 26 Sept. First N applied, raked by hand, seed sown: 27 Sept. Weedkillers applied: 23 Nov. Tridemorph applied: 19 Dec. Second N applied, weedkillers plus benomyl applied: 2 Apr, 1980. Carbendazim and tridemorph applied: 29 Apr. Insecticide applied: 9 June. Hand harvested: 4 Aug.
Permanent grass: PK applied: 28 Nov, 1979. FYM applied: 28 Feb, 1980. N applied: 29 Feb, 22 May and 10 July. Cut: 22 May, 10 July, 14 Aug and 14 Oct.

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80/R/RN/5

GREAT FIELD IV (R):ORIGINAL PLOTS

TONNES/HECTARE

***** TABLES OF MEANS *****

	WINTER WHEAT:		SPRING BARLEY:		LEY : DRY MATTER				
	GRAIN	STRAW	GRAIN	STRAW	1ST CUT	2ND CUT	3RD CUT	4TH CUT	TOTAL OF 4 CUTS
MANURE									
0	4.00	3.87	2.90	2.15	0.87	0.99	1.09	0.86	3.82
N1	5.67	5.12	5.36	3.74	2.14	1.22	1.05	0.84	5.25
P	5.90	6.78	2.92	2.16	2.27	2.50	2.44	1.85	9.06
N1P	4.97	5.89	3.05	2.95	3.22	1.39	1.15	1.23	7.00
K	4.41	4.00	2.65	2.19	1.95	1.75	1.99	1.54	7.24
N1K	6.59	5.49	5.66	4.52	2.30	1.45	1.64	1.44	6.83
PK	4.82	4.70	3.18	2.64	3.12	3.11	3.42	2.39	12.05
N1PK	8.13	7.20	5.81	4.22	3.79	2.67	2.78	2.08	11.32
N2PK	9.77	8.22	7.19	5.64	4.90	2.34	2.38	2.23	11.85
D	5.88	5.89	4.76	3.43	3.25	2.64	2.47	2.23	10.59
N1PKD	9.22	9.26	6.19	5.14	5.00	2.93	2.91	2.46	13.30
N2PKD	10.50	9.84	7.94	6.12	6.08	2.50	2.35	2.09	13.02
MEAN DM%	82.2	58.9	82.6	65.2	25.6	19.8	13.6	19.9	19.7

	KALE: FRESH WEIGHT	POTATOES: TOTAL TUBERS	PERMANENT GRASS : DRY MATTER 1ST CUT	2ND CUT	3RD CUT	4TH CUT	TOTAL OF 4 CUTS
MANURE							
0	5.4	13.5	0.78	0.52	0.37	0.36	2.03
N1	10.0	11.5	1.56	1.08	1.05	0.74	4.43
P	15.4	15.8	0.75	0.49	0.38	0.30	1.92
N1P	13.5	9.6	1.88	1.40	1.36	0.57	5.21
K	5.4	33.8	1.07	0.71	0.55	0.59	2.92
N1K	3.5	43.8	2.36	1.55	1.23	0.72	5.87
PK	33.1	51.7	1.10	0.80	0.55	0.59	3.04
N1PK	54.2	68.6	2.92	1.54	1.51	0.55	6.52
N2PK	71.9	67.5	4.70	2.35	2.12	0.98	10.15
D	50.7	62.3	4.38	1.29	1.12	0.85	7.64
N1PKD	74.6	82.5	4.69	2.19	1.95	0.70	9.54
N2PKD	86.1	87.7	6.45	3.67	2.76	1.21	14.10
MEAN DM%			29.3	25.3	20.8	31.5	26.7

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80/R/RN/5

GREAT FIELD IV (R): ADDITIONAL PLOTS

***** TABLES OF MEANS *****

	WINTER WHEAT: GRAIN	WINTER WHEAT: STRAW	WINTER BARLEY: GRAIN	WINTER BARLEY: STRAW	WINTER OATS: GRAIN	WINTER OATS: STRAW	POTATOES: TOTAL TUBERS
MANURES							
0	4.93	4.84	2.30	1.96	4.09	4.78	15.0
N2PK	9.09	10.17	6.77	6.74	7.42	12.59	67.1
N2PKMG	7.64	7.87	7.16	6.34	8.48	12.13	69.0
N2PKS	8.99	9.79	7.20	6.17	7.42	11.61	69.0
N2PKMGS	9.04	9.18	7.24	5.59	7.11	10.72	61.9
N1PKMGS	7.68	8.12	5.64	5.25	7.81	10.82	64.8
N3PKMGS	9.24	9.16	7.83	6.61	8.57	12.12	67.3
MEAN DM%	82.7	57.6	78.4	42.4	79.7	39.7	

LEY : DRY MATTER

	1ST CUT	2ND CUT	3RD CUT	4TH CUT	TOTAL OF 4 CUTS
MANURES					
0	1.48	1.27	1.39	1.13	5.27
N2PK	5.90	2.54	2.41	2.10	12.94
N2PKMG	5.90	2.81	2.83	2.16	13.70
N2PKS	4.55	2.69	2.50	1.96	11.70
N2PKMGS	5.52	2.59	2.67	2.16	12.95
N1PKMGS	5.68	2.42	2.41	2.08	12.60
N3PKMGS	5.39	2.91	2.93	2.15	13.37
MEAN DM%	26.3	19.7	12.9	19.3	19.5

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80/W/RN/6

ARABLE REFERENCE PLOTS

Object: To study the long term effects of FYM and N, P and K fertilisers on the yield and mineral content of crops - Woburn Stackyard C.

Sponsor: F.V. Widdowson.

The 21st year, w. barley, w. oats, permanent grass.

For previous years see 60/B/3(t), 61-65/B/2, 66/B/2(t), 67/B/2(t), 68/B/3(t), 69/W/RN/6, 70/W/RN/6(t) and 71-79/W/RN/6.

Design: Blocks of 12 plots for each crop. Barley and oats one third replicate of 3 x 12 x 3 in 3 blocks of 12 plots. Permanent grass 1 block of 12 plots.

Whole plot dimensions: 2.74 x 2.13.

Treatments: All combinations of:-

Blocks

1. CROP — Crops in 1980 and previous crops:

BW(OW)	W. barley after w. oats in 1979 (arable since 1960)
BW(BS)	W. barley after s. barley in 1979 (arable since 1960)
BW(BS G)	W. barley after s. barley in 1979 (grass 1960-73, arable thereafter)
OW(P)	W. oats after potatoes in 1979
OW(SB)	W. oats after sugar beet in 1979
OW(L)	W. oats after one-year ley in 1979

Plots

2. MANURE(79) — Fertilisers and farmyard manure (until 1979, none in 1980):

0
N1
P
N1P
K
N1K
PK
N1PK
N2PK
D
N1PKD
N2PKD

N1,2 (kg N): 31.5, 63 (ley): 63, 126 (s. barley and oats): 126, 252 (sugar beet and potatoes): 188, 376 (permanent grass) as ammonium nitrate.
P: P_2O_5 at 63 kg as triple superphosphate.
K: K_2O at 252 kg as potassium bicarbonate.
D: Farmyard manure at 25 tonnes (permanent grass): 50 tonnes (sugar beet and potatoes): none to other crops.

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and some of the combinations of 1 & 2 with:

3. N 80 Nitrogen fertiliser (kg N):

90	25 kg N to seedbed, 30 kg N in February, 35 kg N in April
120	25 kg N to seedbed, 40 kg N in February, 55 kg N in April
150	25 kg N to seedbed, 50 kg N in February, 75 kg N in April

plus one extra block in permanent grass, sown autumn 1973 (PERMGRAS) testing MANURE as above except that treatments were also applied in 1980.

Standard applications:
W. barley and w. oats: Manures: Chalk at 3.7 t. Weedkillers: Ioxynil at 0.32 kg with mecoprop 0.94 kg in 280 l applied twice, with tridemorph on the first occasion, with benomyl on the second. Fungicides: Tridemorph at 0.53 kg. Benomyl at 0.28 kg. Carbendazim at 0.25 kg plus tridemorph at 0.53 kg in 280 l. Insecticide to w. oats only: Phorate at 2.2 kg.

Seed: W. barley: Sonja, sown at 210 kg.
W. oats: Pennal, sown at 210 kg.
Permanent Grass: S215 meadow fescue at 20 kg, S24 perennial ryegrass at 20 kg, crested dogstail at 7 kg, Chewings fescue at 7 kg, smooth stalk meadow fescue at 7 kg, alsike clover at 4 kg, wild white clover at 2 kg. Mixture sown at 67 kg.

Cultivations, etc.:-
W. barley: Rotary cultivated: 3 Sept, 1979. Seed sown, first N applied: 28 Sept. Weedkillers with tridemorph applied, chalk applied: 28 Nov. Second N applied: 18 Feb, 1980. Third N applied, weedkillers with benomyl applied: 1 Apr. Carbendazim plus tridemorph applied: 29 Apr. Harvested: 21 July.
W. oats: Balancing Mg applied and plots dug by hand after potatoes: 2 Oct, 1979. Plots dug by hand after ley: 3 Oct. Balancing Mg applied and plots dug by hand after sugar beet: 17 Oct. Phorate applied, raked in, seed sown, first N applied: 18 Oct. Weedkillers and tridemorph applied, chalk applied: 28 Nov. Second N applied: 18 Feb, 1980. Third N applied, weedkillers with benomyl applied: 1 Apr. Carbendazim plus tridemorph applied: 29 Apr. Harvested: 31 July.
Permanent Grass: P and K applied: 28 Nov, 1979. FYM applied: 11 Mar, 1980. N applied: 11 Mar, 21 May, 8 July. Cut: 21 May, 8 July, 6 Oct.

NOTE: N, P and K contents of grain were measured.

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80/W/RN/6

WINTER BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

CROP	BW(OW)	BW(BS)	BW(BS G)	MEAN
MANURE(79)				
0	5.21	3.90	4.50	4.54
N1	3.99	4.08	3.08	3.71
P	5.56	4.49	2.99	4.34
N1P	3.66	3.02	2.56	3.08
K	5.80	4.96	6.83	5.86
N1K	5.97	5.56	5.41	5.65
PK	5.71	5.46	6.63	5.93
N1PK	5.78	5.90	5.27	5.65
N2PK	5.87	5.70	5.89	5.82
D	5.84	6.91	6.58	6.44
N1PKD	6.06	5.80	6.80	6.22
N2PKD	6.35	7.08	6.37	6.60
MEAN	5.48	5.24	5.24	5.32

N 80	90	120	150	MEAN
MANURE(79)				
0	3.90	5.21	4.50	4.54
N1	3.08	4.08	3.99	3.71
P	4.49	5.56	2.99	4.34
N1P	2.56	3.02	3.66	3.08
K	4.96	5.80	6.83	5.86
N1K	5.41	5.56	5.97	5.65
PK	5.46	5.71	6.63	5.93
N1PK	5.27	5.90	5.78	5.65
N2PK	5.87	5.89	5.70	5.82
D	5.84	6.58	6.91	6.44
N1PKD	6.06	6.80	5.80	6.22
N2PKD	6.35	6.37	7.08	6.60
MEAN	4.94	5.54	5.49	5.32

GRAIN MEAN DM% 81.1

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80/W/RN/6

WINTER BARLEY

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

CROP MANURE(79)	BW(OW)	BW(BS)	BW(BS G)	MEAN
0	4.77	3.89	4.83	4.50
N1	4.30	3.42	2.95	3.56
P	5.48	4.26	3.43	4.39
N1P	4.30	3.38	3.07	3.59
K	5.32	4.78	6.17	5.42
N1K	5.54	4.88	4.79	5.07
PK	5.52	5.82	6.97	6.11
N1PK	6.21	5.81	5.09	5.70
N2PK	5.81	5.48	7.29	6.19
D	6.00	7.46	8.05	7.17
N1PKD	5.95	6.43	6.58	6.32
N2PKD	6.71	7.01	7.27	7.00
MEAN	5.49	5.22	5.54	5.42

N 80 MANURE(79)	90	120	150	MEAN
0	3.89	4.77	4.83	4.50
N1	2.95	3.42	4.30	3.56
P	4.26	5.48	3.43	4.39
N1P	3.07	3.38	4.30	3.59
K	4.78	5.32	6.17	5.42
N1K	4.79	4.88	5.54	5.07
PK	5.82	5.52	6.97	6.11
N1PK	5.09	5.81	6.21	5.70
N2PK	5.81	7.29	5.48	6.19
D	6.00	8.05	7.46	7.17
N1PKD	5.95	6.58	6.43	6.32
N2PKD	6.71	7.27	7.01	7.00
MEAN	4.93	5.65	5.68	5.42

STRAW MEAN DM% 57.4

PLOT AREA HARVESTED 0.00050

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80/W/RN/6

WINTER OATS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

CROP	OW(P)	OW(SB)	OW(L)	MEAN
MANURE(79)				
0	4.20	4.11	4.96	4.42
N1	3.76	4.12	4.19	4.02
P	4.72	3.77	4.03	4.18
N1P	3.73	3.80	4.20	3.91
K	5.28	4.30	5.91	5.16
N1K	6.22	5.38	4.96	5.52
PK	5.67	5.07	6.12	5.62
N1PK	6.86	6.27	6.20	6.44
N2PK	4.60	6.39	6.09	5.70
D	6.49	6.93	6.98	6.80
N1PKD	6.79	6.26	6.95	6.67
N2PKD	6.57	7.27	6.55	6.79
MEAN	5.41	5.31	5.59	5.44

N 80	90	120	150	MEAN
MANURE(79)				
0	4.11	4.20	4.96	4.42
N1	4.19	4.12	3.76	4.02
P	3.77	4.72	4.03	4.18
N1P	4.20	3.80	3.73	3.91
K	4.30	5.28	5.91	5.16
N1K	4.96	5.38	6.22	5.52
PK	5.07	5.67	6.12	5.62
N1PK	6.20	6.27	6.86	6.44
N2PK	4.60	6.09	6.39	5.70
D	6.49	6.98	6.93	6.80
N1PKD	6.79	6.95	6.26	6.67
N2PKD	6.57	6.55	7.27	6.79
MEAN	5.10	5.50	5.70	5.44

GRAIN MEAN DM% 72.3

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80/W/RN/6

WINTER OATS

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

CROP MANURE(79)	OW(P)	OW(SB)	OW(L)	MEAN
0	3.87	3.91	5.13	4.30
N1	3.89	3.88	3.81	3.86
P	4.85	3.83	4.40	4.36
N1P	3.92	4.00	3.59	3.84
K	5.51	4.69	6.56	5.59
N1K	6.29	5.59	5.12	5.67
PK	7.91	6.90	6.86	7.22
N1PK	7.86	7.24	6.81	7.30
N2PK	5.56	6.55	6.78	6.30
D	7.36	7.87	7.26	7.50
N1PKD	9.02	8.24	8.31	8.52
N2PKD	8.74	8.43	8.18	8.45
MEAN	6.23	5.93	6.07	6.08

N 80 MANURE(79)	90	120	150	MEAN
0	3.91	3.87	5.13	4.30
N1	3.81	3.88	3.89	3.86
P	3.83	4.85	4.40	4.36
N1P	3.59	4.00	3.92	3.84
K	4.69	5.51	6.56	5.59
N1K	5.12	5.59	6.29	5.67
PK	6.90	7.91	6.86	7.22
N1PK	6.81	7.24	7.86	7.30
N2PK	5.56	6.78	6.55	6.30
D	7.36	7.26	7.87	7.50
N1PKD	9.02	8.31	8.24	8.52
N2PKD	8.74	8.18	8.43	8.45
MEAN	5.78	6.12	6.33	6.08

STRAW MEAN DM% 44.0

PLOT AREA HARVESTED 0.00050

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80/W/RN/6

PERMANENT GRASS

TONNES/HECTARE

***** TABLES OF MEANS *****

PERMGRAS : DRY MATTER

	1ST CUT	2ND CUT	3RD CUT	TOTAL OF 3 CUTS
MANURE(79)				
0	1.65	1.68	1.79	5.12
N1	2.42	2.30	3.24	7.96
P	1.39	1.31	1.39	4.09
N1P	2.66	2.06	2.91	7.62
K	1.73	1.90	2.01	5.64
N1K	2.87	2.94	3.64	9.46
PK	2.05	2.10	2.17	6.33
N1PK	2.78	3.08	3.64	9.50
N2PK	3.83	3.42	4.29	11.54
D	2.93	2.26	2.93	8.13
N1PKD	3.64	3.24	4.32	11.20
N2PKD	4.33	3.89	4.90	13.11
MEAN DM%	22.4	21.2	30.6	24.7

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80/R/RN/7

RESIDUAL PHOSPHATE

Object: Originally to study the fresh and residual effects of phosphate fertiliser on the yields of three arable crops grown in rotation. From 1974 the effects on ley and on yield and pathogens of continuous w. wheat were studied. In 1980 only ley was included - Great Field IV and Sawyers I.

Sponsors: G.E.G. Mattingly.

The 21st year, ley.

For previous years see 'Details' 1967 and 1973 and 74-79/R/RN/7.

Design: Great Field IV: 3 series each of 1 randomised block of 12 plots.
Sawyers I: 3 series each of 2 randomised blocks of 12 plots.

Whole plot dimensions:
Great Field IV: 4.27 x 18.3
Sawyers I: 4.27 x 20.1

Treatments:

P2O5	Rates and frequency of applying phosphate:-
NONE	0
	Annual dressings, kg P2O5:
29 ANN	29
57 ANN	57
115 ANN	115
172 ANN	172
	Triennial dressings, kg P2O5 (last applied 1978):
86 TRI	86
176 TRI	172
	Six-yearly dressings, kg P2O5 (last applied 1973):
344 SIX	344
688 SIX	688
1032 SIX	1032
	Single dressing, kg P2O5 (applied autumn 1959):
376 G(1)	376 as Gafsa rock phosphate
376 S(1)	376 as granular superphosphate

NOTES: (1) From 1974 the original rotation of potatoes, s. barley, swedes on both fields was changed. Blocks after barley were sown to w.wheat on Sawyers I, to ley on Great Field IV. In 1978 & 1979 one series was sown to ley each year on Sawyers I. In 1980 the remaining series on Sawyers I was fallowed.
(2) Since 1960 all phosphate has been applied as superphosphate.
(3) The six-yearly dressings were applied half in autumn before ploughing, half in spring.

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80/R/RN/7

Standard applications:
Leys: Manures: K_2O at 250 kg as muriate of potash.
Fallow: Manures: Chalk at 2.9 t.

Cultivations, etc.:-
Leys: K applied: 28 Nov, 1979. Test P applied: 13 Mar, 1980. Cut: 29 May, 22 July, 23 Oct (Sawyers I only), 24 Oct (Gt Field IV only).
Fallow: Chalk applied: 8 Nov, 1979. Ploughed: 22 Nov. Heavy spring-tine cultivated: 22 Apr, 1980. Spring-tine cultivated: 22 May. Rotary harrowed: 4 Aug.

GREAT FIELD IV

SERIES I LEY

DRY MATTER TONNES/HECTARE

	CUT 1 (29/5/80)	CUT 2 (22/7/80)	CUT 3 (24/10/80)	TOTAL OF 3 CUTS
P205				
NONE	1.75	1.81	0.90	4.46
29 ANN	3.19	2.36	1.41	6.96
57 ANN	3.32	2.45	2.08	7.85
115 ANN	3.37	2.57	1.81	7.75
172 ANN	3.74	2.79	1.63	8.16
86 TRI	2.71	2.19	1.71	6.61
172 TRI	3.16	2.38	1.70	7.24
344 SIX	3.09	2.02	1.34	6.44
688 SIX	3.40	2.21	1.58	7.20
1032 SIX	3.50	2.83	1.60	7.93
376 G(1)	2.31	2.07	1.21	5.58
376 S(1)	2.19	1.87	0.87	4.93
MEAN	2.98	2.30	1.49	6.76
MEAN DM%	19.3	19.1	22.1	20.1

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80/R/RN/7 GREAT FIELD IV

SERIES II LEY

DRY MATTER TONNES/HECTARE

P205	CUT 1 (29/5/80)	CUT 2 (22/7/80)	CUT 3 (24/10/80)	TOTAL OF 3 CUTS
NONE	1.66	1.57	0.85	4.08
29 ANN	3.43	2.24	1.41	7.08
57 ANN	3.89	2.51	1.69	8.09
115 ANN	4.18	2.55	1.73	8.45
172 ANN	4.38	2.56	2.02	8.95
86 TRI	3.13	2.25	1.35	6.72
172 TRI	3.78	2.45	1.56	7.79
344 SIX	3.43	2.39	1.67	7.49
688 SIX	4.33	2.37	1.66	8.37
1032 SIX	4.01	2.40	1.59	8.00
376 G(1)	2.65	2.17	0.98	5.81
376 S(1)	2.65	1.69	1.11	5.45
MEAN	3.46	2.26	1.47	7.19
MEAN DM%	20.3	20.1	21.6	20.7

SERIES III LEY

DRY MATTER TONNES/HECTARE

P205	CUT 1 (29/5/80)	CUT 2 (22/7/80)	CUT 3 (24/10/80)	TOTAL OF 3 CUTS
NONE	2.17	1.30	0.97	4.44
29 ANN	4.48	2.17	1.59	8.25
57 ANN	4.25	2.05	1.67	7.97
115 ANN	4.21	2.51	1.64	8.37
172 ANN	4.87	2.56	2.00	9.43
86 TRI	3.35	2.06	1.64	7.06
172 TRI	4.23	2.10	1.47	7.80
344 SIX	4.02	1.96	1.51	7.50
688 SIX	4.03	2.56	1.55	8.15
1032 SIX	4.75	2.12	1.78	8.65
376 G(1)	2.44	1.72	1.26	5.42
376 S(1)	2.24	1.20	0.70	4.14
MEAN	3.75	2.03	1.48	7.26
MEAN DM%	19.8	21.2	23.3	21.5

PLOT AREA HARVESTED 0.00186

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80/R/RN/7 SAWYERS I

SERIES II LEY

DRY MATTER TONNES/HECTARE

	CUT 1 (29/5/80)	CUT 2 (22/7/80)	CUT 3 (23/10/80)	TOTAL OF 3 CUTS
P205				
NONE	3.55	1.85	1.19	6.59
29 ANN	3.79	2.51	1.65	7.94
57 ANN	3.89	2.85	1.87	8.61
115 ANN	3.66	3.01	1.91	8.58
172 ANN	3.57	2.86	2.09	8.52
86 TRI	3.59	2.50	1.64	7.74
172 TRI	3.79	2.28	1.73	7.79
344 SIX	3.54	2.24	1.46	7.24
688 SIX	3.67	2.43	1.85	7.95
1032 SIX	3.67	2.56	2.05	8.28
376 G(1)	3.49	1.89	1.33	6.72
376 S(1)	3.47	2.10	1.35	6.93
MEAN	3.64	2.42	1.68	7.74
SED*	0.175	0.240	0.189	0.398
CV%	4.8	9.9	11.3	5.1
MEAN DM%	22.2	20.3	25.5	22.7

* NOTE STRATUM STANDARD ERROR (11 df) is also equal to this figure

SERIES III LEY

DRY MATTER TONNES/HECTARE

	CUT 1 (29/5/80)	CUT 2 (22/7/80)	CUT 3 (23/10/80)	TOTAL OF 3 CUTS
P205				
NONE	2.03	2.04	1.72	5.80
29 ANN	2.82	2.51	2.10	7.43
57 ANN	2.81	2.66	2.24	7.71
115 ANN	3.10	2.63	2.06	7.80
172 ANN	3.03	2.83	2.30	8.17
86 TRI	2.00	2.57	1.89	6.45
172 TRI	2.67	2.63	2.03	7.34
344 SIX	2.70	2.39	1.88	6.97
688 SIX	2.57	2.75	2.18	7.49
1032 SIX	2.98	2.61	2.11	7.70
376 G(1)	2.18	2.09	1.49	5.76
376 S(1)	2.03	2.48	1.68	6.18
MEAN	2.58	2.52	1.97	7.07
SED*	0.273	0.181	0.161	0.489
CV%	10.6	7.2	8.2	6.9
MEAN DM%	22.6	19.0	24.0	21.9

PLOT AREA HARVESTED 0.00204

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80/R/RN/8

CULTIVATION/WEEDKILLER

Object: To study the long-term effects of weedkillers and different methods of primary cultivation on a sequence of crops - Great Harpenden I.

Sponsors: R. Moffit, G.V. Dyke, J.A. Currie.

The 20th year, s. barley.

For previous years see 'Details' 1967 and 1973 and 74-79/R/RN/8.

Design: 2 randomised blocks of 12 plots split into 2.

Whole plot dimensions: 12.8 x 15.2.

Treatments: All combinations of:-

Whole plots

1. CULTIVTN — Primary cultivations annually:

   PLOUGH — Ploughed: 24 Oct, 1979
   ROTAVATE — Rotary cultivated by rotary digger: 25 Oct
   DEEPTINE — Deep-tine cultivated twice: 24 Oct

2. WEEDCNTL(76) — Weed control to beans and potatoes in the rotation beans, wheat, potatoes, barley practised until 1976. Last applied to beans 1976:

   MECHANCL — Mechanical
   RESIDUAL — Residual weedkiller (duplicated)

Sub plots

3. WEEDKLLR(75) — Hormone weedkiller to cereals in the previous rotation, last applied to barley 1975 (basal hormone weedkiller to s. wheat 1977 and s. barley 1978 to 1980):

   NONE
   HORMONE

4. WEEDKLLR(80) — Paraquat weedkiller to cereal stubbles: 23 Oct, 1979.

   NONE
   PARAQUAT

NOTE: The combinations of 3 and 4 are tested on half plots: WEEDKLLR(75) NONE, WEEDKLLR(80) NONE and WEEDKLLR(75) HORMONE, WEEDKLLR(70) PARAQUAT on one block, remaining combinations on the other.

EXTRA — plus three extra whole plot treatments:

   SPNGTINE — Heavy spring-tine cultivated twice: 24 Oct, 1979. Given simazine to beans 1976, with sub plot tests 3 and 4 above.
   SH PLGH — Shallow ploughed: 24 Oct, 1979. Given simazine to beans 1976 and paraquat to cereal stubbles with sub plot test 3 above.

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80/R/RN/8

STANDARD — Standard cultivations as considered best for each crop. Ploughed 24 Oct, 1979. Given simazine to beans 1976, with sub plot tests 3 and 4 above.

NOTE: Paraquat was applied at 0.56 kg ion in 220 l.

Basal applications: Manures: Chalk at 7.5 t. (20:10:10) at 450 kg, combine drilled. Fungicide: Tridemorph at 0.53 kg in 250 l applied twice, with weedkillers on the first occasion. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l).

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- Chalk applied: 9 Oct, 1979. Spring-tine cultivated: 2 Mar, 1980. Rotary harrowed: 3 Mar. Seed sown: 4 Mar. Rolled: 5 Mar. Weedkiller and fungicide applied: 9 May. Fungicide applied: 4 June. Combine harvested: 18 Aug.

EXTRA PLOTS ONLY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

	EXTRA	SPNGTINE	SH PLGH	STANDARD
WEEDKLLR(75)				
	NONE	6.22	5.75	6.25
	HORMONE	6.13	6.43	5.43
WEEDKLLR(80)				
	NONE	6.17		5.70
	PARAQUAT	6.18	6.09	5.99
	MEAN	6.17	6.09	5.84

GRAIN MEAN DM% 83.8

SUB PLOT AREA HARVESTED 0.00434

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80/R/RN/8

OMITTING EXTRA PLOTS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

CULTIVTN	PLOUGH	ROTAVATE	DEEPTINE	MEAN
WEEDCNTL(76)				
MECHANCL	5.77	5.63	5.68	5.69
RESIDUAL	6.28	5.79	5.69	5.92
MEAN	6.11	5.74	5.69	5.84
WEEDKLLR(75)				
NONE	6.07	5.59	5.59	5.75
HORMONE	6.15	5.88	5.78	5.94
MEAN	6.11	5.74	5.69	5.84
WEEDKLLR(80)				
NONE	6.19	5.68	5.67	5.85
PARAQUAT	6.02	5.79	5.71	5.84
MEAN	6.11	5.74	5.69	5.84

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	CULTIVTN	WEEDCNTL(76)	WEEDKLLR(75)	WEEDKLLR(80)
SED	0.127	0.110	0.127	0.127

TABLE	CULTIVTN	CULTIVTN	CULTIVTN	
	WEEDCNTL(76)	WEEDKLLR(75)	WEEDKLLR(80)	
SED	0.220			MIN REP
	0.190	0.201	0.201	MAX-MIN
	0.155			MAX REP

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:

CULTIVTN	0.220	0.220

	WEEDCNTL(76)
MIN REP	MECHANCL
MAX-MIN	MECHANCL V RESIDUAL
MAX REP	RESIDUAL

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	11	0.220	3.8
BLOCK.WP.SP	10	0.380	6.5

GRAIN MEAN DM% 84.0

SUB PLOT AREA HARVESTED 0.00434

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80/W/RN/12

ORGANIC MANURING

Object: To study, from crop yields and soil analyses, the residual effects of a range of types of organic matter - Woburn, Stackyard B.

Sponsor: G.E.G. Mattingly.

The 16th year, s. barley, sugar beet, ley.

For previous years see 'Details' 1973 and 74-79/W/RN/12.

Design for s. barley and sugar beet: 2 blocks of 6 plots split into 8
1st & 2nd year ley: 2 blocks of 2 plots.

Whole plot dimensions: 8.53 x 30.5.

Treatments: From 1966 to 1971 the experiment had a preliminary period designed to build up organic matter, derived from different sources. An arable rotation was started on two blocks in 1972 and the remaining two blocks in 1973. Organic manures were last applied in 1971, the leys were ploughed in autumn 1971 and 1972 before starting the rotation. The experiment now tests all combinations of:-

Whole plots

1. MANURE — Organic manures and fertilisers in the preliminary period:

FYM	Farmyard manure
STRAW	Straw
FERT-FYM	Fertilisers equivalent to FYM
FERT-STR	Fertilisers equivalent to straw
CLOVRLEY	Clover/grass ley, no N
GRASSLEY	Grass ley with N for each cut

Sub plots

2. N — Fertiliser nitrogen (kg N):

S. BARLEY	SUGAR BEET
0	0
30	40
60	80
90	120
120	160
150	200
180	240
210	280

Two additional MANURE treatments given green manures (GREENMNR) and peat (PEAT) in the preliminary period have been sown to clover/grass ley - 2 blocks in 1979 and 2 blocks in 1980.

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80/W/RN/12

Standard applications:
S. barley: Manures: P_2O_5 at 110 kg as superphosphate, K_2O at 60 kg as muriate of potash. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 280 l. Fungicides: Tridemorph at 0.53 kg in 280 l, ethirimol (as 'Milgo E' at 1.3 l) in 280 l.
Sugar beet: Manures: Chalk at 5.0 t, (0:20:20) at 1210 kg in autumn, (0:20:20) at 610 kg in spring, Mg at 60 kg as kieserite, Boron at 8.0 kg B_2O_3 (as 'Solubor') in 300 l.
1st year Clover/grass ley: Chalk at 5.0 t, (0:20:20) at 1210 kg and later at 610 kg, Mg at 60 kg as kieserite, N at 60 kg as 'Nitro-Chalk'. Weedkiller: Paraquat at 0.84 kg ion in 450 l.
2nd year Clover/grass ley: P_2O_5 at 110 kg as superphosphate, K_2O at 60 kg as muriate of potash.

Seed: S. barley: Georgie, dressed with ethirimol, sown at 160 kg.
Sugar beet: Bush Mono G, sown at 5.6 kg.
Clover/grass ley: Climax timothy at 7 kg, S.215 meadow fescue at 14 kg, Huia white clover at 2 kg, mixture sown at 23 kg.

Cultivations, etc.:-
S. barley: Ploughed in sugar beet tops: 22 Nov, 1979. P and K applied: 14 Jan, 1980. Heavy spring-tine cultivated: 29 Feb. Spring-tine cultivated with crumbler attached: 3 Mar. Seed sown: 4 Mar. N applied: 21 Mar. Weedkiller applied: 8 May. Tridemorph applied: 13 May. 'Milgo E' applied: 5 June. Combine harvested: 28 Aug.
Sugar beet: Chalk applied: 13 Nov, 1979. Ploughed: 22 Nov. Autumn PK applied: 4 Mar, 1980. Ploughed: 11 Mar. Spring PK and Mg applied: 31 Mar. Heavy spring-tine cultivated: 8 Apr. Rotary cultivated: 9 Apr. N applied, seed sown: 11 Apr. Tractor hoed: 22 May, 4 June, 20 June. Singled: 29 May. Side-hoed by hand: 16 June. Boron applied: 19 June. Lifted: 4-7 Nov.
1st year Clover/grass ley: Chalk applied: 13 Nov, 1979. Ploughed: 22 Nov. PK applied: 4 Mar, 1980. Ploughed: 11 Mar. PK and Mg applied: 31 Mar. Heavy spring-tine cultivated: 8 Apr. Rotary cultivated: 9 Apr. N applied: 11 Apr. Seeds sown: 17 Apr. Topped: 9 June. Paraquat applied because of poor germination: 26 June. Rotary cultivated: 30 June. Spring-tine cultivated: 2 July. Spring-tine cultivated with crumbler attached, seeds re-sown: 11 July.
2nd year Clover/grass ley: P and K applied: 20 Mar, 1980. Cut: 4 June, 8 Sept. Topped: 18 Sept.

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80/W/RN/12 SPRING BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N / MANURE	0	30	60	90	120	150	180	210	MEAN
FYM	3.24	4.32	5.27	5.25	5.12	5.77	6.09	6.27	5.16
STRAW	2.74	4.08	4.43	4.72	6.00	5.83	5.67	5.11	4.82
FERT-FYM	2.46	3.55	4.52	4.46	4.96	4.99	5.45	5.67	4.51
FERT-STR	2.29	3.78	4.27	4.86	5.72	5.39	5.56	4.75	4.58
CLOVRLEY	3.47	4.57	5.07	5.07	5.08	5.32	5.20	5.33	4.89
GRASSLEY	3.28	4.27	5.07	4.82	6.32	6.21	5.78	5.98	5.22
MEAN	2.91	4.10	4.77	4.86	5.53	5.58	5.62	5.52	4.86

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE	N	MANURE N
SED	0.596	0.239	0.809
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			0.584

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.596	12.3
BLOCK.WP.SP	42	0.584	12.0

GRAIN MEAN DM% 83.1

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N / MANURE	0	30	60	90	120	150	180	210	MEAN
FYM	0.95	1.85	2.32	2.19	2.88	3.02	3.32	3.67	2.52
STRAW	0.89	1.72	2.00	2.96	3.14	3.43	3.22	3.42	2.60
FERT-FYM	0.77	1.48	1.99	2.84	3.17	2.98	3.20	3.46	2.49
FERT-STR	0.72	1.53	2.01	1.99	2.94	2.85	3.82	3.98	2.48
CLOVRLEY	1.38	1.84	2.34	2.43	3.30	3.47	3.53	4.08	2.80
GRASSLEY	1.08	2.13	2.13	2.63	3.11	3.70	4.28	4.20	2.91
MEAN	0.97	1.76	2.13	2.51	3.09	3.24	3.56	3.80	2.63

STRAW MEAN DM% 82.8

SUB PLOT AREA HARVESTED 0.00173

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80/W/RN/12 SUGAR BEET

ROOTS WASHED TONNES/HECTARE

***** TABLES OF MEANS *****

N / MANURE	0	40	80	120	160	200	240	280	MEAN
FYM	19.8	26.8	42.2	39.5	48.4	53.0	47.6	46.8	40.5
STRAW	21.0	30.7	35.1	41.4	44.5	47.3	47.8	43.1	38.9
FERT-FYM	14.4	22.9	32.1	41.5	44.5	46.1	48.4	42.3	36.5
FERT-STR	17.4	28.6	37.7	42.6	48.0	42.5	50.2	47.1	39.3
CLOVRLEY	25.1	34.4	40.2	41.9	44.0	45.2	49.4	47.5	41.0
GRASSLEY	26.3	40.3	42.2	44.7	48.9	51.2	50.7	49.4	44.2
MEAN	20.7	30.6	38.2	41.9	46.4	47.5	49.0	46.0	40.1

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE	N	MANURE N
SED	1.65	1.39	3.59
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			3.41

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	5	1.65	4.1
BLOCK.WP.SP	42	3.41	8.5

SUGAR PERCENTAGE

***** TABLES OF MEANS *****

N / MANURE	0	40	80	120	160	200	240	280	MEAN
FYM	17.4	18.0	17.8	17.9	17.7	17.7	16.7	16.6	17.5
STRAW	17.7	18.2	17.9	17.5	17.6	17.1	17.1	16.6	17.5
FERT-FYM	17.3	17.5	17.9	18.1	18.1	17.4	17.4	16.7	17.5
FERT-STR	17.2	18.0	17.7	17.9	17.6	16.8	16.5	16.7	17.3
CLOVRLEY	17.5	17.9	18.1	18.0	17.5	17.2	17.0	16.5	17.5
GRASSLEY	17.3	17.8	17.7	17.4	17.4	16.7	16.4	16.9	17.2
MEAN	17.4	17.9	17.8	17.8	17.6	17.1	16.8	16.7	17.4

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80/W/RN/12 SUGAR BEET
TOTAL SUGAR TONNES/HECTARE
***** TABLES OF MEANS *****

N / MANURE	0	40	80	120	160	200	240	280	MEAN
FYM	3.45	4.83	7.51	7.09	8.56	9.36	7.93	7.76	7.06
STRAW	3.73	5.59	6.28	7.24	7.84	8.09	8.20	7.14	6.76
FERT-FYM	2.49	4.03	5.72	7.52	8.04	8.03	8.39	7.04	6.41
FERT-STR	3.00	5.16	6.68	7.62	8.44	7.14	8.26	7.88	6.77
CLOVRLEY	4.38	6.17	7.27	7.56	7.70	7.80	8.39	7.83	7.14
GRASSLEY	4.54	7.18	7.47	7.77	8.51	8.55	8.30	8.36	7.59
MEAN	3.60	5.49	6.82	7.47	8.18	8.16	8.24	7.67	6.95

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE	N	MANURE N
SED	0.289	0.268	0.678
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			0.656

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	5	0.289	4.1
BLOCK.WP.SP	42	0.656	9.4

TOPS TONNES/HECTARE
***** TABLES OF MEANS *****

N / MANURE	0	40	80	120	160	200	240	280	MEAN
FYM	14.8	19.2	34.5	34.4	46.6	56.7	63.6	68.4	42.3
STRAW	12.7	19.7	29.5	40.5	43.8	49.3	56.1	61.6	39.1
FERT-FYM	10.8	15.3	22.0	32.1	40.5	43.4	56.7	58.9	35.0
FERT-STR	12.9	18.1	25.5	35.9	49.0	53.2	65.0	66.6	40.8
CLOVRLEY	18.0	25.3	34.7	39.6	49.3	51.8	56.0	66.1	42.6
GRASSLEY	20.8	32.6	34.0	45.2	57.4	67.8	67.7	67.0	49.0
MEAN	15.0	21.7	30.0	37.9	47.7	53.7	60.9	64.8	41.5

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	MANURE	N	MANURE N
SED	2.76	1.77	4.90
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
MANURE			4.33

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	5	2.76	6.7
BLOCK.WP.SP	42	4.33	10.4

SUB PLOT AREA HARVESTED 0.00130

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80/W/RN/13

INTENSIVE CEREALS

Object: To study the effects of intensive cereal cropping on yield, incidence of soil-borne pathogens and organic matter in the soil - Woburn Stackyard I.

Sponsors: A.E. Johnston, J. McEwen.

The 15th year, w. wheat, s. barley.

For previous years see 'Details' 1973 and 74-79/W/RN/13.

Design: For each experiment: 2 randomised blocks of 6 plots, split into 4. DAZOMET tested on blocks.

Whole plot dimensions: 8.53 x 20.4.

Treatments:-
One experiment on w. wheat on part of the site of the classical wheat experiment 1877-1954
One experiment on s. barley on part of the site of the classical barley experiment 1877-1954
Factors tested on both experiments are the same but crop and nitrogen rates differ. All combinations of:-

Blocks

1. DAZOMET — Dazomet (1979 & 1980, cumulative to a test of none and aldicarb in 1977 & 1978) applied in autumn (kg):

0
336

Whole plots

2. PREVCROP — Previous crops:

	1972	1973	1974	1975	1976	1977	1978	1979
P C3	C	C	C	L	P	C	C	C
P C4	C	C	L	P	C	C	C	C
P C5	C	L	P	C	C	C	C	C
P C6	L	P	C	C	C	C	C	C
L C3	P	C	C	C	L	C	C	C
C14	C	C	C	C	C	C	C	C

L = 1 year ley P = Potatoes C = Cereal: wheat or barley. All plots in cereal from 1977.

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80/W/RN/13

Sub plots

3. N Nitrogen fertiliser (kg N), cumulative:

W. Wheat	S. Barley	W. Wheat Autumn	W. Wheat Spring	S. Barley Spring
0 + 63	50	0	+ 63	50
0 + 126	100	0	+ 126	100
0 + 189	150	0	+ 189	150
63 + 189	200	63	+ 189	200

Standard applications:
W. wheat: Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Glyphosate at 1.7 kg in 250 l. Isoproturon at 2.1 l in 280 l. Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in 280 l). Insecticide: Demeton-s-methyl at 0.21 kg in 300 l.
S. barley: Manures: (0:20:20) at 300 kg, combine drilled. Weedkillers: ('Brittox' at 3.5 l in 280 l). Fungicide: Tridemorph at 0.53 kg in 280 l. Ethirimol ('Milgo E' at 1.3 l in 280 l).

Seed: W. wheat: Flanders, sown at 190 kg.
S. barley: Georgie, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
All plots: Ploughed: 24 Sept, 1979. Dazomet applied and all plots rotary cultivated: 25 Sept.
W. wheat: Glyphosate applied: 13 Sept, 1979. Spring-tine cultivated with crumbler attached: 24 Oct. Seed sown: 13 Nov. Autumn N applied: 19 Nov. Isoproturon applied: 12 Apr, 1980. Spring N and 'Brittox' applied: 15 Apr. Insecticide applied: 5 July. Combine harvested: 26 Aug.
S. barley: Heavy spring-tine cultivated: 3 Mar, 1980, 24 Mar, 9 Apr. Rotary cultivated, seed sown: 10 Apr. N applied: 15 Apr. 'Brittox' and tridemorph applied: 16 May. Ethirimol applied: 5 June. Combine harvested: 22 Aug.

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80/W/RN/13

WINTER WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PREVCROP / DAZOMET	P C3	P C4	P C5	P C6	L C3	C14	MEAN
0	4.18	4.16	4.19	4.44	3.99	4.50	4.24
336	4.56	4.73	4.38	5.13	3.98	4.50	4.55
MEAN	4.37	4.44	4.28	4.78	3.99	4.50	4.39

N / DAZOMET	0+63	0+126	0+189	63+189	MEAN
0	3.31	4.27	4.80	4.59	4.24
336	3.34	4.46	5.07	5.32	4.55
MEAN	3.32	4.37	4.93	4.95	4.39

N / PREVCROP	0+63	0+126	0+189	63+189	MEAN
P C3	3.20	4.56	4.67	5.05	4.37
P C4	3.41	4.50	4.98	4.89	4.44
P C5	3.12	4.20	4.65	5.15	4.28
P C6	3.67	4.54	5.59	5.32	4.78
L C3	2.95	4.18	4.43	4.38	3.99
C14	3.59	4.22	5.27	4.93	4.50
MEAN	3.32	4.37	4.93	4.95	4.39

DAZOMET / N / PREVCROP	0+63	0+126	0+189	63+189
0 P C3	3.29	4.53	4.24	4.64
P C4	3.33	4.31	4.62	4.39
P C5	3.03	4.12	4.62	4.98
P C6	3.51	4.19	5.29	4.75
L C3	2.81	4.34	4.73	4.08
C14	3.91	4.15	5.29	4.67
336 P C3	3.11	4.58	5.10	5.46
P C4	3.48	4.69	5.34	5.40
P C5	3.22	4.29	4.69	5.31
P C6	3.84	4.89	5.90	5.90
L C3	3.10	4.02	4.13	4.68
C14	3.27	4.29	5.25	5.19

GRAIN MEAN DM% 86.2

SUB PLOT AREA HARVESTED 0.00277

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80/W/RN/13

SPRING BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PREVCROP / DAZOMET	P C3	P C4	P C5	P C6	L C3	C14	MEAN
0	4.72	4.52	4.64	4.09	4.63	4.47	4.51
336	5.33	4.68	5.27	5.29	5.13	5.26	5.16
MEAN	5.02	4.60	4.95	4.69	4.88	4.86	4.83

N / DAZOMET	50	100	150	200	MEAN
0	3.46	4.34	5.09	5.15	4.51
336	4.21	5.29	5.64	5.50	5.16
MEAN	3.83	4.81	5.37	5.33	4.83

N / PREVCROP	50	100	150	200	MEAN
P C3	4.24	4.96	5.65	5.23	5.02
P C4	3.72	4.73	4.87	5.07	4.60
P C5	3.66	5.07	5.63	5.44	4.95
P C6	3.74	4.65	5.09	5.28	4.69
L C3	3.83	4.66	5.53	5.50	4.88
C14	3.81	4.80	5.42	5.43	4.86
MEAN	3.83	4.81	5.37	5.33	4.83

N / DAZOMET / PREVCROP	50	100	150	200
0 P C3	3.83	4.40	5.50	5.13
0 P C4	3.34	4.55	5.01	5.17
0 P C5	3.24	4.88	5.28	5.15
0 P C6	3.16	3.80	4.53	4.87
0 L C3	3.69	4.09	5.35	5.39
0 C14	3.50	4.30	4.87	5.21
336 P C3	4.65	5.52	5.80	5.33
336 P C4	4.10	4.90	4.74	4.97
336 P C5	4.09	5.27	5.98	5.74
336 P C6	4.33	5.50	5.65	5.69
336 L C3	3.98	5.23	5.71	5.61
336 C14	4.11	5.30	5.98	5.64

GRAIN MEAN DM% 83.3

SUB PLOT AREA HARVESTED 0.00277

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80/W/RN/14

LONG TERM PHOSPHATE

Object: To study the residual effects of superphosphate on a clover/grass ley - Woburn Stackyard III.

Sponsor: G.E.G. Mattingly.

The 13th year, clover/grass ley.

For previous years see 68/B/8(t), 69/W/RN/14, 70/W/RN/14(t), 71/W/RN/14(t), 72/W/RN/14(t) and 73-79/W/RN/14.

Design: 6 blocks of 6 plots, split into 2.

Whole plot dimensions: 8.53 x 15.8.

Treatments: All combinations of:-

Whole plots

1. P2O5RES(73) Residues of superphosphate applied autumn 1967 and spring 1973 (kg P2O5):

	1967	1973	Total
0	None	None	None (Duplicate plots)
360	188	172	360
720	376	344	720
1440	753	687	1440
2160	1130	1030	2160

Sub plots

2. P2O5 80 Superphosphate in 1980 in addition to residues, applied in three equal dressings 1970-72, (kg P2O5):

0(0)	None
57(376)	57 in 1980, 376 total applied 1970-72.

Basal applications: Manures: Chalk at 2.5 t. K_2O at 240 kg as muriate of potash. MgO at 30 kg as Kieserite in winter. (25:0:16) at 370 kg in spring and after the second cut.

Cultivations, etc.:- Chalk applied: 13 Nov, 1979. K applied: 14 Jan, 1980. Mg and NK applied: 11 Mar. P treatments applied: 13 Mar. Cut: 9 June, 10 July, 12 Sept. NK applied: 21 July.

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80/W/RN/14

1ST CUT(9/6/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P205RES(73)	0	360	720	1440	2160	MEAN
P205 80						
0(0)	4.80	5.13	4.96	5.48	4.92	5.02
57(376)	4.96	5.11	5.19	5.46	4.58	5.04
MEAN	4.88	5.12	5.07	5.47	4.75	5.03

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	P205RES(73)	P205 80	P205RES(73) P205 80	
SED	0.300		0.339	MIN REP
	0.260	0.092	0.294	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.224	MIN REP
			0.159	MAX REP

P205RES(73)
MAX REP 0
MAX-MIN 0 V ANY OF THE REMAINDER
MIN REP ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.519	10.3
BLOCK.WP.SP	31	0.388	7.7

1ST CUT MEAN DM% 30.5

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80/W/RN/14
2ND CUT (10/7/80)DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P205RES(73) / P205 80	0	360	720	1440	2160	MEAN
0(0)	1.46	1.40	1.48	1.41	1.42	1.44
57(376)	1.47	1.45	1.34	1.33	1.68	1.46
MEAN	1.46	1.42	1.41	1.37	1.55	1.45

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	P205RES(73)	P205 80	P205RES(73) P205 80	
SED	0.118		0.152	MIN REP
	0.102	0.055	0.131	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.136	MIN REP
			0.096	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.204	14.1
BLOCK.WP.SP	31	0.235	16.3

2ND CUT MEAN DM% 20.6

3RD CUT (12/9/80)DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P205RES(73) / P205 80	0	360	720	1440	2160	MEAN
0(0)	3.36	3.22	3.32	3.16	3.60	3.34
57(376)	3.19	3.34	3.38	3.60	3.33	3.34
MEAN	3.28	3.28	3.35	3.38	3.47	3.34

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	P205RES(73)	P205 80	P205RES(73) P205 80	
SED	0.164		0.204	MIN REP
	0.142	0.070	0.177	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.172	MIN REP
			0.122	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.283	8.5
BLOCK.WP.SP	31	0.299	8.9

3RD CUT MEAN DM% 22.1

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80/W/RN/14

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

P205RES(73)	0	360	720	1440	2160	MEAN
P205 80						
0(0)	9.62	9.75	9.76	10.05	9.94	9.79
57(376)	9.63	9.89	9.91	10.39	9.59	9.84
MEAN	9.62	9.82	9.84	10.22	9.77	9.81

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	P205RES(73)	P205 80	P205RES(73) P205 80	
SED	0.295		0.350	MIN REP
	0.256	0.108	0.303	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
P205RES(73)			0.265	MIN REP
			0.187	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	26	0.511	5.2
BLOCK.WP.SP	31	0.459	4.7

TOTAL OF 3 CUTS MEAN DM% 24.4

PLOT AREA HARVESTED 0.00145

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80/W/RN/16

EFFECTS OF DEEP PK

Object: To study the residual effects of subsoiling and of incorporating a large dressing of PK in either the subsoil or topsoil, on yields and nutrient uptakes of s. barley - Woburn Butt Furlong.

Sponsor: J. McEwen.

The seventh year, s. barley.

For previous years see 74-79/W/RN/16.

Design: 4 series of 3 randomised blocks of 4 plots with PREVCROP on series.

Whole plot dimensions: 4.27 x 2.59.

Treatments: All combinations of:-

Series

1. PREVCROP — Previous cropping (1974-1977) (all in barley 1978 & 1979):

P B B	W. wheat, sugar beet, s. barley, potatoes
W B B	Sugar beet, s. barley, potatoes, w. wheat
S B B	S. barley, potatoes, w. wheat, sugar beet
B B B	Potatoes, w. wheat, sugar beet, s. barley

Plots

2. PK SUB — Extra PK and subsoil treatment (applied autumn 1973):

	Extra PK	Subsoil (25-50 cm) treatment
- - -	None	None
- - S	None	Subsoiled
P K T	To topsoil (0-25 cm)	None
P K S	To subsoil	Subsoiled

NOTES: (1) The rates of P and K were 1930 kg P205, as superphosphate and 460 kg K20 as muriate of potash. These quantities, applied to subsoil, were chosen to equalize available P and K in top and subsoil.
(2) Subsoiling was done by spade, after removing the topsoil which was then replaced. PK to subsoil was worked in by forking.
(3) PK to topsoil was applied half before ploughing in autumn half soon after on the plough furrow.

Basal applications: Manures: All Series: Magnesian limestone at 2.5 t; (20:10:10) at 540 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' 3.5 l in 280 l). Fungicide: Tridemorph ('Beacon' 0.7 l in 280 l).

Seed: Georgie, dressed with ethirimol, sown at 160 kg.

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80/W/RN/16

Cultivations, etc.:- Magnesian limestone applied: 31 Oct, 1979. Ploughed: 2 Nov. Spring-tine cultivated with crumbler attached, seed sown: 29 Feb, 1980. Weedkiller applied: 25 Apr. Fungicide applied: 13 May. Harvested by hand: 7 Aug.

NOTE: N, P, K, Na, Ca and Mg contents of grain were measured.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PK SUB / PREVCROP	- - -	- - S	P K T	P K S	MEAN
P B B	5.99	6.59	5.78	6.34	6.18
W B B	5.43	5.97	5.31	5.90	5.65
S B B	5.67	6.27	5.45	6.40	5.95
B B B	5.13	5.57	5.69	5.96	5.59
MEAN	5.55	6.10	5.56	6.15	5.84

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB	PREVCROP* PK SUB
SED	0.173	0.346

* ONLY WHEN COMPARING MEANS WITH SAME LEVELS OF PREVCROP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.186	3.2
BLOCK.WP.SP	24	0.423	7.2

GRAIN MEAN DM% 80.7

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

PK SUB / PREVCROP	- - -	- - S	P K T	P K S	MEAN
P B B	4.36	4.40	4.07	4.58	4.35
W B B	3.90	4.25	3.54	4.35	4.01
S B B	4.27	4.19	4.03	4.19	4.17
B B B	3.87	3.81	4.65	4.28	4.15
MEAN	4.10	4.16	4.07	4.35	4.17

STRAW MEAN DM% 58.8

SUB PLOT AREA HARVESTED 0.00065

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80/R/CS/10 and 80/W/CS/10

LONG TERM LIMING

Object: To study the effects of different amounts of lime on the yields of a sequence of crops. The effects of P, K and Mg are also studied - Rothamsted (R) Sawyers I and Woburn (W) Stackyard C.

Sponsors: G.E.G. Mattingly, A. Penny.

The 19th year, fallow.

For previous years see 'Details' 1967, 1973 and 74-79/R&W/CS/10.

Design: 2 randomised blocks of 16 plots, split into 2.

Whole plot dimensions: 6.40 x 18.3.

The experiments were fallowed in 1980.

Cultivations, etc.:-
Sawyers I (R): Ploughed: 4 Dec, 1979. Heavy spring-tine cultivated: 21 Apr, 1980. Spring-tine cultivated: 22 May. Rotary cultivated: 19 June. Rotary harrowed: 4 Aug.
Stackyard C (W): Heavy spring-tine cultivated: 11 Sept, 1979, 3 Mar, 1980, 7 Aug. Ploughed: 29 Nov, 1979. Rotary cultivated: 29 July, 1980.

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80/W/CS/11

SOIL STRUCTURE

Object: To study the residual effects of peat, at a range of nitrogen levels, on the yield of a sequence of crops - Woburn Stackyard II.

Sponsor: A.E. Johnston.

The 18th year, w. barley.

For previous years see 64/C/20(t), 65/C/19(t), 66/C/11(t), 67/C/8(t), 68/C/31(t), 69/W/CS/11(t), 70/W/CS/11(t), 71/W/CS/11. 72/W/CS/11(t) and 73-79/W/CS/11.

Design: Single replicate of 5 x 4.

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

1. PEAT — Peat (tonnes dry matter - total applied 1963-72):

   0
   8
   55
   110
   165

2. N — Nitrogen fertiliser (kg N) cumulative to previous treatments:

   0
   50
   100
   150

Basal applications: Manures: P at 85 kg, as triple superphosphate, K at 300 kg, as potassium bicarbonate, Mg at 55 kg, as magnesium sulphate. Weedkillers: Ioxynil at 0.32 kg with mecoprop at 0.94 kg in 280 l applied twice, with tridemorph on the first occasion, with benomyl on the second. Fungicides: Tridemorph at 0.53 kg. Benomyl at 0.28 kg. Carbendazim at 0.25 kg plus tridemorph at 0.53 kg in 280 l.

Seed: Sonja, sown at 210 kg.

Cultivations, etc.:- P, K, Mg applied: 12 Sept, 1979. Hand dug: 20 Sept. Seed sown: 1 Oct. Weedkillers with tridemorph applied: 28 Nov. Weedkillers with benomyl applied: 1 Apr, 1980. N applied: 9 Apr. Carbendazim plus tridemorph applied: 29 Apr. Hand harvested: 18 July.

NOTE: (1) Soil and crop samples were taken for N, P, K and Mg analysis.
(2) N, P, K & Mg contents of soils and crop were measured.

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80/W/CS/11

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N / PEAT	0	50	100	150	MEAN
0	3.09	5.91	7.02	7.99	6.00
8	3.00	6.11	7.61	7.66	6.09
55	3.35	5.37	6.82	8.27	5.95
110	3.81	6.27	6.93	7.47	6.12
165	3.32	5.56	7.06	8.49	6.10
MEAN	3.31	5.84	7.09	7.98	6.05

GRAIN MEAN DM% 81.6

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

N / PEAT	0	50	100	150	MEAN
0	2.89	5.20	6.42	6.87	5.34
8	2.62	6.24	7.19	6.87	5.73
55	3.34	4.90	6.31	7.64	5.55
110	3.65	6.12	6.40	6.76	5.73
165	3.15	5.71	6.68	6.85	5.60
MEAN	3.13	5.64	6.60	7.00	5.59

STRAW MEAN DM% 54.5

PLOT AREA HARVESTED 0.00065

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80/R/CS/13

N LEVELS TO OLD GRASS

Object: To study the effects of a range of nitrogen rates on yield and botanical composition of very old permanent pasture. N fixed by legumes is estimated and the effect of treatments on nutrients available in the soil is also studied - Park Grass Old Plot 6.

Sponsor: A.E. Johnston.

The 16th year, old grass.

For previous years see 'Details' 1973 and 74-79/R/CS/13.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 1.83 x 10.1.

Treatments

TOTAL N	Fertiliser nitrogen (kg N-total per annum applied in four equal dressings as 25:0:16):
0(S)	0 (sprayed with ioxynil plus mecoprop to control legumes, duplicated)
0	0 (duplicated)
75	
150	
225	
300	
375	
450	

NOTE: Ioxynil at 0.42 kg with mecoprop at 1.3 kg in 280 l applied on 2 May, 1980.

Basal applications: Manures: 34 kg P as superphosphate. 11 kg Mg as magnesium sulphate.

Cultivations, etc.:- Basal P and Mg applied: 29 Nov, 1979. NK applied: 10 Mar, 1980, 19 May, 2 July, 12 Aug. Cut: 19 May, 2 July, 12 Aug, 24 Oct.

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80/R/CS/13

1ST CUT (19/5/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

TOTAL N	O(S)	0	75	150	225	300	375	450	MEAN
	0.28	1.59	1.35	1.79	2.90	3.32	3.54	4.08	2.07

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TOTAL N	
SED	0.169	MIN REP
	0.146	MAX-MIN
	0.119	MAX REP

	TOTAL N
MAX REP	O(S) V 0
MAX-MIN	O(S) OR 0 V ANY OF THE REMAINDER
MIN REP	ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.239	11.5

1ST CUT MEAN DM% 27.5

2ND CUT (2/7/80)DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

TOTAL N	O(S)	0	75	150	225	300	375	450	MEAN
	0.46	1.78	1.60	1.80	1.98	2.18	2.37	2.39	1.68

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TOTAL N	
SED	0.117	MIN REP
	0.101	MAX-MIN
	0.083	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.165	9.8

2ND CUT MEAN DM% 20.8

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80/R/CS/13

3RD CUT (12/8/80)DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.41	1.56	1.70	2.17	2.32	2.71	3.30	3.13	1.93

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TOTAL N	
SED	0.103	MIN REP
	0.089	MAX-MIN
	0.072	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.145	7.5

3RD CUT MEAN DM% 16.8

4TH CUT (24/10/80)DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	0.31	0.61	0.86	1.35	1.14	1.60	1.16	1.21	0.92

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TOTAL N	
SED	0.235	MIN REP
	0.203	MAX-MIN
	0.166	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.332	36.2

4TH CUT MEAN DM% 17.5

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80/R/CS/13

TOTAL OF 4 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

TOTAL N	0(S)	0	75	150	225	300	375	450	MEAN
	1.45	5.54	5.51	7.11	8.35	9.80	10.38	10.82	6.60

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TOTAL N	
SED	0.338	MIN REP
	0.293	MAX-MIN
	0.239	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.478	7.3

TOTAL OF 4 CUTS MEAN DM% 20.6

PLOT AREA HARVESTED 0.00086

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80/W/CS/34

NEMATICIDES IN CROP SEQUENCE

Object: To study the effects of a range of nematicides on incidence of Globodera rostochiensis and yield of potatoes. Residual effects of previous treatments are studied in wheat and barley - Woburn Great Hill II and III.

Sponsor: A.G. Whitehead.

The 11th year, potatoes, s. barley.

For previous years see 71/W/CS/34(t), 72/W/CS/34(t) and 73-79/W/CS/34.

Design: 4 series of 3 blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14.

Treatments: The experiment has four series with the following cropping:-

	1969	70	71	72	73	74	75	76	77	78	79	80
Series I	P	P	P*	SB	B	P	P*	W	B	P	P*	B+
Series II	P	P	P	P*	SB	B	P	P*	W	B	P	P*
Series III	P	B	P	P	P*	SB	B	P	P*	W	B	P
Series IV	P	B	P	P	P	P*	SB	B	P	P*	W	B

P = potatoes, SB = sugar beet, B = s. barley, W = w. wheat

* Treatments applied to potatoes, later crops test residual effects.
\+ W. wheat failed and was replaced by s. barley.

Treatments to s. barley (Series I): All combinations of:-

1. NEMACIDE(79) Residues of nematicides applied 1979:

   ALDICARB Aldicarb
   CARBENDA Carbendazim
   TERBUFOS Terbufos

2. RATE Rates of nematicide (kg a.i.):

   SINGLE Single (2.5 kg for aldicarb and terbufos : 5.0 kg for carbendazim)
   DOUBLE Double (5.0 kg for aldicarb and terbufos : 10.0 kg for carbendazim)
   QUAD Quadruple (10.0 kg for aldicarb and terbufos : 20.0 kg for carbendazim)

plus one untreated plot

RATE

NONE

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80/W/CS/34

Treatments to potatoes (Series II):

NEMACIDE(80)	Nematicides applied 1980 (kg a.i.):
NONE	None
BAS 1	'BAS 263 08J 80-1' at 2.8
BAS 2	'BAS 263 08J 80-1' at 5.6
BAS 4	'BAS 263 08J 80-1' at 11.2
CARBOF 2	Carbofuran at 5.6
ETHOP 4	Ethoprophos at 11.2
FMC 2	'FMC 35001' at 5.6
OX 2	Oxamyl at 5.6
OX S1 2	Oxamyl slow-release formulation 'DPX 4702' at 5.6
OX S2 2	Oxamyl slow-release formulation 'DPX 5577' at 5.6

Treatments to potatoes (Series III): All combinations of:-

1. NEMACIDE(77) Residues of nematicides applied 1977:

AC 64475	'AC 64475'
CARBOFUR	Carbofuran
PHOXIM	Phoxim

2. RATE Rates of nematicide (kg a.i.):

		'AC 64475'	Carbofuran	Phoxim
SINGLE	Single	2.2	2.8	5.6
DOUBLE	Double	4.4	5.6	11.2
QUAD	Quadruple	8.8	11.2	22.4

plus one untreated plot

RATE

NONE

Treatments to s. barley (Series IV): All combinations of:-

1. NEMACIDE(78) Residues of nematicides applied 1978:

BENDIOCA	Bendiocarb
THIOPHAN	Thiophanate methyl
TERBUFOS	Terbufos

2. RATE Rates of nematicide (kg a.i.):

5
10
20

plus one untreated plot

RATE

0.0

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80/W/CS/34

Standard applications:
Barley (Series I after failed w. wheat & IV): Manures: Magnesian limestone at 5 t to Series I only, (0:20:20) at 310 kg, combine drilled to wheat Series I only, (20:10:10) at 450 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 4.9 l in 280 l). Fungicides: Tridemorph to Series I only at 0.53 kg in 280 l. Triadimefon to Series IV only at 0.13 kg in 280 l.
Potatoes (Series II and Series III): Manures: (13:13:20) at 1880 kg. Weedkiller: Linuron at 1.1 l in 280 l. Fungicide: Mancozeb at 1.3 kg in 300 l applied five times, with insecticide on the first, third, fourth and fifth occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

Seed: Wheat: Flanders, sown at 190 kg.
Barley: Georgie, dressed with ethirimol, sown at 160 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
Wheat (Series I): Magnesian limestone applied, heavy spring-tine cultivated, spring-tine cultivated, seed sown: 31 Oct, 1979. Ploughed: 14 Feb, 1980.
Barley (Series I & IV): Ploughed (Series IV): 23 Nov, 1979. Spring-tine cultivated with crumbler attached: 28 Feb, 1980. Seed sown: 29 Feb. Weedkillers qpplied: 7 May. Tridemorph applied: 13 May and 5 June to Series I. Triadimefon applied: 5 June to Series IV. Combine harvested: 19 Aug.
Potatoes (Series II & III): Heavy spring-tine cultivated, spring-tine cultivated: 30 Oct, 1979 (Series II). Ploughed: 23 Nov (Series III), 14 Feb, 1980 (Series II). NPK applied: 12 Apr. Rotary cultivated, potatoes planted: 18 Apr (Series III). Spring-tine cultivated: 23 Apr (Series II). Treatments applied, rotary cultivated, potatoes planted: 28 Apr (Series II). Weedkiller applied: 17 May. Grubbed: 11 June. Earthed up: 12 June. Fungicide applied: 18 June, 3 July, 22 July, 8 Aug, 22 Aug. Insecticide applied: 18 June, 22 July, 8 Aug, 22 Aug. Haulm mechanically destroyed: 22 Sept. Haulm desiccant applied: 24 Sept. Lifted: 1 - 2 Oct.

NOTE: Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs and larvae of Globodera rostochiensis.

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80/W/CS/34

POTATOES SERIES II

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

NEMACIDE(80)	
NONE	29.2
BAS 1	51.4
BAS 2	49.7
BAS 4	51.3
CARBOF 2	55.4
ETHOP 4	54.2
FMC 2	46.8
OX 2	59.9
OX S1 2	58.4
OX S2 2	61.3
MEAN	51.8

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	NEMACIDE(80)
SED	2.37

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	18	2.90	5.6

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

***** TABLES OF MEANS *****

NEMACIDE(80)	
NONE	94.2
BAS 1	97.6
BAS 2	96.8
BAS 4	97.9
CARBOF 2	97.6
ETHOP 4	97.8
FMC 2	97.1
OX 2	97.6
OX S1 2	97.5
OX S2 2	98.0
MEAN	97.2

PLOT AREA HARVESTED 0.00130

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80/W/CS/34

POTATOES SERIES III

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	54.4	55.8	59.7	56.6
CARBOFUR	52.7	55.2	57.6	55.2
PHOXIM	48.1	50.8	52.9	50.6
MEAN	51.7	53.9	56.8	54.1

RATE NONE 48.3

GRAND MEAN 53.6

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	NEMACIDE(77)	RATE NEMACIDE(77)	RATE & RATE NONE
SED	1.50	1.50	2.60

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	18	3.18	5.9

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

***** TABLES OF MEANS *****

RATE NEMACIDE(77)	SINGLE	DOUBLE	QUAD	MEAN
AC 64475	98.6	98.1	98.4	98.4
CARBOFUR	98.6	98.6	98.7	98.6
PHOXIM	98.5	98.3	98.4	98.4
MEAN	98.6	98.3	98.5	98.5

RATE NONE 98.4

GRAND MEAN 98.5

PLOT AREA HARVESTED 0.00130

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80/W/CS/34

BARLEY SERIES I

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

RATE NEMACIDE(79)	SINGLE	DOUBLE	QUAD	MEAN
ALDICARB	3.90	4.14	3.57	3.87
CARBENDA	3.63	3.52	3.91	3.69
TERBUFOS	3.83	4.36	4.19	4.13
MEAN	3.78	4.01	3.89	3.90

RATE NONE 3.93

GRAND MEAN 3.90

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	NEMACIDE(79)	RATE NEMACIDE(79)	RATE NEMACIDE(79) & RATE NONE
SED	0.205	0.205	0.354

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.434	11.1

GRAIN MEAN DM% 81.0

PLOT AREA HARVESTED 0.00260

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80/W/CS/34

BARLEY SERIES IV

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

RATE NEMACIDE(78)	5	10	20	MEAN
BENDIOCA	4.36	4.39	4.84	4.53
THIOPHAN	4.85	4.74	4.74	4.78
TERBUFOS	4.47	4.55	4.74	4.59
MEAN	4.56	4.56	4.77	4.63

RATE 0.0 4.59

GRAND MEAN 4.63

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	NEMACIDE(78)	RATE NEMACIDE(78)	RATE & RATE 0.0
SED	0.173	0.173	0.300

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.368	8.0

GRAIN MEAN DM% 81.3

PLOT AREA HARVESTED 0.00260

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80/W/CS/35

NEMATICIDES DOSAGE

Object: To study the effects of rates and methods of applying nematicides on Globodera rostochiensis and yield of potatoes; residual effects are also studied - Woburn Stackyard AII.

Sponsor: A.G. Whitehead.

The ninth year, potatoes, w. wheat, s. barley.

For previous years see 72/W/CS/35(t) and 73-79/W/CS/35.

Design: 3 series each 4 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 6.10.

Treatments:-

The experiment has three series with the following cropping:-

	1968-71	72	73	74	75	76	77	78	79	80
Series I	P	P*	SB	B	P*	P	P	P*	W	B
Series II	P	P	P*	SB	B	P*	P	P	P*	W
Series III	P	P	P	P*	SB	B	P*	P	P	P*

P = Potatoes, SB = Sugar beet, B = S. barley, W = W. wheat

*Treatments applied to potatoes, following two crops test residual effects.

Treatments:

On Series I, s. barley 1980, new sets of treatments were applied for potatoes in 1978 which ignored those applied in earlier years. All combinations of:-

1. A NEM(78) — Residual effects of nematicide applied autumn 1977:

   NONE — None
   TELONE — 'Telone' at 224 kg

2. S NEM(78) — Residual effects of nematicide applied spring 1978:

   ALDICARB
   OXAMYL

3. SNEMRATE — Rates of spring nematicides (kg):

   2.5
   5.0
   7.5
   10.0

plus two untreated plots per block

RATE

NONE

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80/W/CS/35

On Series II, w. wheat 1980, the same sets of treatments were applied for potatoes in 1979, ignoring those applied in earlier years. All combinations of:-

1. A NEM(79) Residual effects of nematicide applied autumn 1978:

   NONE None
   TELONE 'Telone' at 224 kg

2. S NEM(79) Residual effects of nematicide applied spring 1979:

   ALDICARB
   OXAMYL

3. SNEMRATE Rates of spring nematicides (kg):

    2.5
    5.0
    7.5
   10.0

plus two untreated plots per block

RATE

NONE

On Series III, potatoes 1980, a planned test of 'Telone' was omitted, other treatments tested on Series I and II were applied, ignoring those in earlier years. All combinations (duplicated) of:-

1. S NEM(80) Spring nematicides:

   ALDICARB
   OXAMYL

2. SNEMRATE Rates of spring nematicides (kg):

    2.5
    5.0
    7.5
   10.0

plus two untreated plots per block

RATE

NONE

Standard applications:
S. barley (Series I): Manures: (20:10:10) at 450 kg, combine drilled. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l in 280 l) with fungicide. Fungicide: Tridemorph at 0.53 kg.
W. wheat (Series II): Manures: Magnesian limestone at 5.0 t. (10:23:23) at 260 kg, combine drilled. 'Nitro-Chalk' at 490 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l in 280 l).

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80/W/CS/35

Potatoes (Series III): Manures: (13:13:20) at 1880 kg. Weedkiller: Linuron at 1.1 l in 280 l. Fungicide: Mancozeb at 1.3 kg in 300 l applied on five occasions, with insecticide on the first, third, fourth and fifth occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

Seed: S. barley: Georgie, dressed with ethirimol, sown at 160 kg.
W. wheat: Flanders, sown at 190 kg.
Potatoes: Pentland Crown.

Cultivations, etc.:-
S. barley (Series I): Ploughed: 8 Nov, 1979. Heavy spring-tine cultivated: 29 Feb, 1980. Spring-tine cultivated with crumbler attached: 3 Mar. Seed sown: 4 Mar. Spring-tine cultivated, seed resown without fertiliser because of erosion damage: 14 Apr. Weedkillers and fungicide applied: 16 May. Combine harvested: 28 Aug.
W. wheat (Series II): Magnesian limestone applied: 31 Oct, 1979. Ploughed, spring-tine cultivated with crumbler attached. Seed sown: 13 Nov. N applied: 9 Apr, 1980. Weedkillers applied: 15 Apr. Combine harvested: 26 Aug.
Potatoes (Series III): Heavy spring-tine cultivated: 25 Oct, 1979; 18 Feb, 1980. NPK applied: 12 Apr. Heavy spring-tine cultivated: 14 Apr. Aldicarb and oxamyl applied, rotary cultivated: 29 Apr. Potatoes planted: 30 Apr. Weedkiller applied: 16 May. Grubbed: 11 June. Earthed up: 12 June. Fungicide applied: 18 June, 3 July, 22 July, 10 Aug, 22 Aug. Insecticide applied: 18 June, 22 July, 10 Aug, 22 Aug. Haulm mechanically destroyed: 22 Sept. Desiccant applied: 24 Sept. Lifted: 1 Oct.

NOTES: (1) Soil samples were taken before treatments were applied and after harvest for cyst and egg counts of Globodera rostochiensis.
(2) Because of soil erosion damage the yields of s. barley (Series I) were not taken. For the same reason the yields of seven plots of wheat Series II were lost. Two of RATE NONE and those with treatment combinations:

A NEM(79)	NONE	NONE	TELONE	TELONE	TELONE
S NEM(79)	ALDICARB	OXAMYL	ALDICARB	OXAMYL	OXAMYL
SNEMRATE	2.5	2.5	2.5	2.5	7.5

(3) Because of an error at weighing the yields of two plots of potatoes Series III were lost. Both were with the combination S NEM(80) ALDICARB and SNEMRATE 7.5.
Estimated values were used in the analyses.

SERIES II WINTER WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

S NEM(79)	ALDICARB	OXAMYL	MEAN
A NEM(79)			
NONE	6.94	7.01	6.98
TELONE	6.89	7.03	6.96
MEAN	6.91	7.02	6.97

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80/W/CS/35

SERIES II WINTER WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SNEMRATE A NEM(79)	2.5	5.0	7.5	10.0	MEAN
NONE	6.97	6.97	6.95	7.02	6.98
TELONE	6.89	6.80	6.93	7.21	6.96
MEAN	6.93	6.88	6.94	7.11	6.97

SNEMRATE S NEM(79)	2.5	5.0	7.5	10.0	MEAN
ALDICARB	6.81	6.82	6.94	7.09	6.91
OXAMYL	7.05	6.95	6.94	7.14	7.02
MEAN	6.93	6.88	6.94	7.11	6.97

A NEM(79)	SNEMRATE S NEM(79)	2.5	5.0	7.5	10.0
NONE	ALDICARB	6.89	6.91	6.89	7.09
	OXAMYL	7.05	7.03	7.01	6.95
TELONE	ALDICARB	6.73	6.73	7.00	7.09
	OXAMYL	7.06	6.87	6.87	7.32

RATE NONE 6.92

GRAND MEAN 6.96

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	A NEM(79)	S NEM(79)	SNEMRATE	A NEM(79) S NEM(79)
SED	0.115	0.115	0.162	0.162

TABLE	A NEM(79) SNEMRATE	S NEM(79) SNEMRATE	A NEM(79) S NEM(79) SNEMRATE
SED	0.230	0.230	0.325

SED FOR RATE NONE V ANY MEAN IN
A NEM(79).S NEM(79).SNEMRATE TABLE IS 0.281

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	50	0.459	6.6

GRAIN MEAN DM% 85.2

PLOT AREA HARVESTED 0.00173

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80/W/CS/35

SERIES III POTATOES

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

SNEMRATE / S NEM(80)	2.5	5.0	7.5	10.0	MEAN
ALDICARB	45.2	41.4	29.4	35.5	37.9
OXAMYL	33.5	36.6	45.4	39.0	38.6
MEAN	39.3	39.0	37.4	37.3	38.2

RATE NONE 26.1

GRAND MEAN 36.9

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	S NEM(80)	SNEMRATE	S NEM(80) SNEMRATE & RATE NONE
SED	2.60	3.67	5.19

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	58	10.38	28.1

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE

***** TABLES OF MEANS *****

SNEMRATE / S NEM(80)	2.5	5.0	7.5	10.0	MEAN
ALDICARB	93.2	93.0	92.5	93.2	93.0
OXAMYL	91.7	92.6	93.5	92.3	92.5
MEAN	92.4	92.8	93.0	92.8	92.7

RATE NONE 91.1

GRAND MEAN 92.6

PLOT AREA HARVESTED 0.00065

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80/W/CS/66

DAZOMET AND NITROGEN

Object: To study the cumulative effects of dazomet and nitrogen on pathogens and yield of maize grown continuously - Woburn Butt Furlong.

Sponsors: A.J. Barnard, D. Hornby.

The tenth year, forage maize.

For previous years see 71/W/CS/66(t), 72/W/CS/66(t) and 73-79/W/CS/66.

Design: 4 blocks of 2 plots split into 4.

Whole plot dimensions: 2.13 x 16.5.

Treatments: All combinations of:-

Whole plots

1. DAZOMET	Dazomet (kg per annum) cumulative 1971-79, residual 1980:	
	0	
	450	

Sub plots

2. N	Nitrogen fertiliser (kg N as 'Nitro-Chalk') cumulative 1971-80:	
	50	50 to seedbed
	100	100 to seedbed
	150	150 to seedbed
	50+100	100 to seedbed, 50 two weeks before sowing (before 1978 this treatment received 100 to seedbed, 50 five weeks after emergence)

Basal applications: Manures: Magnesian limestone at 2.5 t, (0:14:28) at 630 kg. Weedkiller: Atrazine at 1.1 l in 280 l.

Seed: Fronica, sown at 103,300 seeds per hectare.

Cultivations, etc.:- Magnesian limestone applied: 31 Oct, 1979. Ploughed, spring-tine cultivated: 2 Nov. Heavy spring-tine cultivated: 29 Feb, 1980. Spring-tine cultivated with crumbler attached: 7 Apr. Early N and PK applied: 16 Apr. Weedkiller applied, and harrowed in, seed sown: 30 Apr. Seedbed N applied: 1 May. Hand harvested: 6 Oct.

NOTES: (1) Soil samples were taken in July and after harvest for counts of ectoparasitic nematodes.
(2) Counts were made of common smut (Ustilago maydis) and stalk rots (Fusarium spp.).
(3) Because of poor germination, yields from 2 subplots were lost, one DAZOMET 0, N 50 + 100 the other DAZOMET 450, N 150. Estimated values were used in the analysis.

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80/W/CS/66

FORAGE DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

DAZOMET N	50	100	150	50+100	MEAN
0	8.78	11.61	13.67	13.87	11.98
450	9.58	12.29	15.03	13.51	12.60
MEAN	9.18	11.95	14.35	13.69	12.29

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	N	DAZOMET* N
SED	0.647	0.915

* WITHIN THE SAME LEVEL OF DAZOMET ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	16	1.294	10.5

GRAIN MEAN DM% 24.8

SUB PLOT AREA HARVESTED 0.00039

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80/W/CS/99

EFFECTS OF BREAKS ON TAKE-ALL

Object: To study factors affecting the incidence of take-all (Gaeumannomyces graminis) and their effects on yields of s. barley - Woburn, Butt Furlong.

Sponsor: D. Hornby.

The eight year, s. barley, s. beans, s. oats.

For previous years see 72/W/CS/99(t) and 73-79/W/CS/99.

Design: 2 randomised blocks of 9 plots, 4 of which are split into 2.

Whole plot dimensions: 5.34 x 15.2.

Treatments: All combinations of:-

Whole plots

1. TREATMNT Crop sequences; soil sterilant and inoculum in 1979:

	1968-71	72	73	74	75	76	77	78	79	80
B 7(S)	B	F	BE	B	B	B	B	B	B(S)	B
B 5	B	B	B	F	BE	B	B	B	B	B
B 4(SI)	B	B	B	B	F	BE	B	B	B(SI)	B
B 3(I)	B	B	B	B	B	F	BE	B	B(I)	B

Sub plots

2. INOCULUM Take-all inoculum:

0	None
I	Inoculated

plus five extra plots testing crop sequences alone:

EXTRA

	1968-71	72	73	74	75	76	77	78	79	80
	B	F	B	B	B	B	B	B	F	BE
B 13	B	B	B	B	B	B	B	B	B	B
B 6	B	B	F	BE	B	B	B	B	B	B
B 1	B	B	B	B	B	B	F	BE	0	B
	B	B	B	B	B	B	B	F	BE	0

B = S. barley, BE = S. beans, 0 = S. oats, F = Fallow
(S) = Soil sterilant (1979). Formalin. (I) = Inoculum of take-all (1979) applied on colonised autoclaved oats and combine drilled with barley.
I = Inoculum of take-all 1980, applied on colonised autoclaved oats, in the ratio of three oats to one barley seed, broadcast at 310 kg on the surface and rotary cultivated in.

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80/W/CS/99

Standard applications:
All crops: Weedkillers: Glyphosate at 1.5 kg in 250 l.
S. barley and s. oats: Manures: (20:10:10) at 450 kg, combine drilled. Weedkillers: Mecoprop with bromoxynil and ioxynil as ('Brittox' at 3.5 l) in 280 l with the fungicide. Fungicide: Tridemorph at 0.53 kg.
S. beans: Manures: (0:14:28) at 400 kg. Weedkiller: Simazine at 0.84 kg in 250 l.

Seed: S. barley: Georgie, dressed with ethirimol, sown at 160 kg.
S. oats: Panema, sown at 180 kg.
S. beans: Minden, sown at 200 kg.

Cultivations, etc.:-
All plots: Glyphosate applied: 13 Sept, 1979. Ploughed: 5 Nov. Spring-tine cultivated with crumbler attached: 28 Feb, 1980.
S. barley: Spring-tine cultivated with crumbler attached: 7 Apr, 1980. Seed with inoculum treatment applied, all plots rotary cultivated, seed sown: 9 Apr. 'Brittox' with fungicide applied: 13 May. Combine harvested: 21 Aug.
S. oats: Spring-tine cultivated with crumbler attached: 7 Apr, 1980. Rotary cultivated, seed sown: 9 Apr. 'Brittox' with fungicide applied: 13 May. Combine harvested: 4 Sept.
S. beans: PK applied, seed sown: 28 Feb, 1980. Weedkiller applied: 29 Feb. Combine harvested: 19 Sept.

NOTES: (1) Soil samples were taken before treatments were applied for estimates of Heterodera avenae cysts and eggs and incidence of microflora.
(2) Plant samples were taken in July for incidence of take-all.

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80/W/CS/99

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT INOCULUM	B 7(S)	B 5	B 4(SI)	B 3(I)	MEAN
0	5.08	5.01	4.75	5.11	4.99
I	4.63	4.96	4.54	4.76	4.72
MEAN	4.85	4.99	4.65	4.94	4.86

EXTRA	B 13	B 6	B 1	MEAN
	5.11	5.37	5.51	5.33

GRAND MEAN 5.06

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	INOCULUM	TREATMNT	INOCULUM TREATMNT
SED	0.274	0.185	0.274	0.378

EXCEPT WHEN COMPARING MEANS WITH THE SAME LEVEL(S) OF:
TREATMNT 0.369

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.274	5.4
BLOCK.WP.SP	10	0.369	7.3

GRAIN MEAN DM% 82.9

SUB PLOT AREA HARVESTED 0.00199

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80/R/CS/130

EFFECTS OF EARTHWORM INOCULATION

Object: To study the effects of different species of earthworms on yield and other characteristics of grass - Fosters O & E.

Sponsor: J.R. Lofty.

The seventh year, ley.

For previous years see 74-79/R/CS/130.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 8.53 x 9.14.

Treatments: Inoculation with earthworm species in 1974, 1975 and 1979:

WORMSPEC	
NONE	None
ALLOLOBO	Allolobophora longa at 15,000 per hectare in 1974; 5,000 in 1975; 96,000 in 1979
LUMBRICU	Lumbricus terrestris at 5,000 per hectare in 1974 and 1975; 96,000 in 1979
SIX SPEC	Six species - A. caliginosa, A. chlorotica, A. longa, A. rosea, L. rubellus, L. terrestris at a total of 35,000 per hectare in 1974, 12,000 in 1975, none in 1979

NOTES: (1) The experiment was ploughed in error in July 1976 and resown in autumn 1976.
(2) Earthworms for the 1979 crop were applied on 1 Dec, 1978 to one block only. Applications to other blocks have been postponed.

Basal applications: Manures: (0:14:28) at 500 kg, (25:0:16) at 440 kg in spring, (25:0:16) at 220 kg after the first two cuts.

Seeds mixture: Combi perennial ryegrass at 8.4 kg, S24 perennial ryegrass at 8.4 kg, S23 perennial ryegrass at 5.6 kg, S26 cocksfoot at 5.6 kg, S37 cocksfoot at 5.6 kg, S48 Timothy at 2.8 kg, Pecora Timothy at 2.8 kg, Huia white clover at 2.8 kg, wild white clover at 2.8 kg. Sown at 45 kg.

Cultivations, etc.:- PK applied: 7 Nov, 1979. NK applied: 11 Mar, 1980, 3 June, 25 July. Cut: 28 May, 21 July, 24 Oct.

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80/R/CS/130

1ST CUT (28/5/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	3.03	2.98	2.97	2.95	2.98

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	WORMSPEC
SED	0.342

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.419	14.1

1ST CUT MEAN DM% 29.6

2ND CUT (21/7/80)DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	2.45	2.70	2.64	2.37	2.54

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	WORMSPEC
SED	0.285

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.349	13.7

2ND CUT MEAN DM% 23.7

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80/R/CS/130

3RD CUT (24/10/80)DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	2.28	2.33	2.92	3.30	2.71

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	WORMSPEC
SED	0.506

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.620	22.9

3RD CUT MEAN DM% 27.2

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

WORMSPEC	NONE	ALLOLOBO	LUMBRICU	SIX SPEC	MEAN
	7.76	8.00	8.53	8.62	8.23

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	WORMSPEC
SED	0.726

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.889	10.8

TOTAL OF 3 CUTS MEAN DM% 26.8

PLOT AREA HARVESTED 0.00046

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80/R/CS/133

CONTROL OF PATHOGENS

Object: To study the effects of a range of chemicals on incidence of pathogens and yield of continuous maize - Long Hoos VI/VII 6.

Sponsors: A.J. Barnard, K.E. Fletcher, D.J. Hooper, D. Hornby, R.T. Plumb, T.D. Williams, J.C. Wilson.

The seventh year, forage maize.

For previous years see 74-79/R/CS/133.

Design: 3 randomised blocks of 9 plots split into 3.

Whole plot dimensions: 2.13 x 18.3.

Treatments: All combinations of:-

Whole plots

1.	CHEMICAL	Chemicals applied annually except where stated:
	NONE	None (2 plots per block)
	ALDICARB	Aldicarb, 4.5 kg as granules to seedbed
	BENOMYL	Benomyl, 11.2 kg as dust to seedbed
	DAZOMET	Dazomet, 450 kg as granules in early spring (not applied 1975 & 1979)
	PERMETH	Permethrin, 0.15 kg as foliar spray (1979 only)
	PHORATE	Phorate, 1.68 kg as granules to seedbed
	PIRIMICA	Pirimicarb, 0.14 kg as foliar spray (1979 only)
	BE+DA+PH	Benomyl + dazomet (not applied 1975 & 1979) + phorate, at above rates and times

Sub plots

2.	N	Nitrogen fertiliser (kg N):
	50	
	100	
	150	

NOTE: Dazomet was applied on 5 March, 1980. Treatment sprays were applied in 340 l.

Basal applications: Manures: (0:14:28) at 870 kg. Weedkillers: Atrazine at 1.7 kg in 340 l.

Seed: Fronica, sown at 100,000 seeds per hectare.

Cultivations, etc.:- Ploughed: 23 Nov, 1979. Power harrowed: 5 Mar, 1980. PK applied: 21 Mar. Spring-tine cultivated: 9 May. Power harrowed, seed sown: 12 May. N applied: 15 May. Weedkiller applied: 19 May. Hand harvested: 15 Oct.

NOTE: Frit fly (Oscinella frit) damage was assessed, and the N content of the harvest produce was measured.

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80/R/CS/133

FORAGE MAIZE DRY MATTER TONNES/HECTARE

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	50	100	150	MEAN
CHEMICAL				
NONE	9.72	10.29	10.78	10.26
ALDICARB	9.21	11.95	12.11	11.09
BENOMYL	9.30	10.84	10.88	10.34
DAZOMET	11.55	11.62	13.36	12.18
PERMETH	8.95	10.60	10.51	10.02
PHORATE	8.77	9.48	11.27	9.84
PIRIMICA	9.92	11.19	10.51	10.54
BE+DA+PH	11.32	11.79	12.06	11.72
MEAN	9.83	10.89	11.36	10.70

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	CHEMICAL	N	CHEMICAL N	
SED	0.703		0.928	MIN REP
	0.609	0.247	0.804	MAX-MIN
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CHEMICAL			0.742	MIN REP
			0.525	MAX REP

	CHEMICAL
MAX REP	WITHIN NONE
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.861	8.1
BLOCK.WP.SP	38	0.909	8.5

GRAIN MEAN DM% 21.0

SUB PLOT AREA HARVESTED 0.00059

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80/R/CS/140

CHEMICAL REFERENCE PLOTS

Object: To study the persistence in soil of agricultural chemicals applied annually, singly and in combination and their effects on soil microflora and on yield of continuous s. barley - Long Hoos V 3.

Sponsors: G.G. Briggs, N. Walker, R. MacDonald.

The sixth year, s. barley.

For previous years see 74-79/R/CS/140.

Design: Single replicate of 32 plots.

Whole plot dimensions: 4.06 x 4.57.

Treatments, applied cumulatively 1974-79 except WEEDKLLR(1) - 1974 and 76 only and WEEDKLLR(2) - 1980 only:
All combinations of:-

1.	FUNGCIDE	Fungicide:
	NONE	None
	BENOMYL	Benomyl at 4 kg to the seedbed
2.	INSCTCDE	Insecticide:
	NONE	None
	CHLORFEN	Chlorfenvinphos at 2 kg to the seedbed
3.	NEMACIDE	Nematicide:
	NONE	None
	ALDICARB	Aldicarb at 6 kg to the seedbed as granules
4.	WEEDKLLR(1)	Weedkiller in spring:
	NONE	None
	CHLORTOL	Chlortoluron at 2 kg soon after sowing, applied 1974 and 1976 only
5.	WEEDKLLR(2)	Weedkiller in autumn:
	NONE	None
	GLYPHOS	Glyphosate at 1.5 kg to stubble of 1979 s. barley.

NOTE: Glyphosate was applied on 13 Sept, 1979. Other treatments were applied on 5 Mar, 1980.

Basal applications: 'Nitro-Chalk' at 450 kg. Weedkillers: Dicamba with mecoprop and MCPA (as 'Tetralex Plus' at 5.6 l in 340 l).
Fungicide: Tridemorph at 0.53 kg in 340 l.

Seed: Georgie, seed not dressed, sown at 160 kg.

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80/R/CS/140

Cultivations, etc.:- Ploughed: 29 Oct, 1979. N applied, spring-tine cultivated: 4 Mar, 1980. Spring-tine cultivated, power harrowed, seed sown: 5 Mar. Weedkillers applied: 11 May. Fungicide applied: 4 June. Combine harvested: 19 Aug.

NOTE: Mildew and aphids were assessed during the season.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE	NONE	CHLORFEN	MEAN
FUNGCIDE			
NONE	4.68	4.78	4.73
BENOMYL	4.79	4.68	4.73
MEAN	4.74	4.73	4.73

NEMACIDE	NONE	ALDICARB	MEAN
FUNGCIDE			
NONE	4.63	4.84	4.73
BENOMYL	4.77	4.69	4.73
MEAN	4.70	4.76	4.73

NEMACIDE	NONE	ALDICARB	MEAN
INSCTCDE			
NONE	4.74	4.73	4.74
CHLORFEN	4.66	4.80	4.73
MEAN	4.70	4.76	4.73

WEEDKLLR(1)	NONE	CHLORTOL	MEAN
FUNGCIDE			
NONE	4.68	4.78	4.73
BENOMYL	4.62	4.85	4.73
MEAN	4.65	4.82	4.73

WEEDKLLR(1)	NONE	CHLORTOL	MEAN
INSCTCDE			
NONE	4.69	4.78	4.74
CHLORFEN	4.61	4.85	4.73
MEAN	4.65	4.82	4.73

WEEDKLLR(1)	NONE	CHLORTOL	MEAN
NEMACIDE			
NONE	4.53	4.87	4.70
ALDICARB	4.77	4.76	4.76
MEAN	4.65	4.82	4.73

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80/R/CS/140

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

WEEDKLLR(2)	NONE	GLYPHOS	MEAN
FUNGCIDE			
NONE	4.66	4.80	4.73
BENOMYL	4.65	4.82	4.73
MEAN	4.65	4.81	4.73

WEEDKLLR(2)	NONE	GLYPHOS	MEAN
INSCTCDE			
NONE	4.67	4.80	4.74
CHLORFEN	4.64	4.82	4.73
MEAN	4.65	4.81	4.73

WEEDKLLR(2)	NONE	GLYPHOS	MEAN
NEMACIDE			
NONE	4.64	4.77	4.70
ALDICARB	4.67	4.86	4.76
MEAN	4.65	4.81	4.73

WEEDKLLR(2)	NONE	GLYPHOS	MEAN
WEEDKLLR(1)			
NONE	4.60	4.70	4.65
CHLORTOL	4.71	4.92	4.82
MEAN	4.65	4.81	4.73

INSCTCDE	NONE		CHLORFEN	
NEMACIDE	NONE	ALDICARB	NONE	ALDICARB
FUNGCIDE				
NONE	4.64	4.73	4.62	4.95
BENOMYL	4.85	4.73	4.70	4.65

INSCTCDE	NONE		CHLORFEN	
WEEDKLLR(1)	NONE	CHLORTOL	NONE	CHLORTOL
FUNGCIDE				
NONE	4.67	4.70	4.70	4.87
BENOMYL	4.71	4.87	4.52	4.83

NEMACIDE	NONE		ALDICARB	
WEEDKLLR(1)	NONE	CHLORTOL	NONE	CHLORTOL
FUNGCIDE				
NONE	4.50	4.75	4.86	4.82
BENOMYL	4.56	4.99	4.67	4.71

NEMACIDE	NONE		ALDICARB	
WEEDKLLR(1)	NONE	CHLORTOL	NONE	CHLORTOL
INSCTCDE				
NONE	4.66	4.83	4.72	4.74
CHLORFEN	4.41	4.91	4.81	4.79

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80/R/CS/140

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE	NONE		CHLORFEN	
WEEDKLLR(2)	NONE	GLYPHOS	NONE	GLYPHOS
FUNGCIDE				
NONE	4.64	4.73	4.69	4.88
BENOMYL	4.70	4.87	4.59	4.76

NEMACIDE	NONE		ALDICARB	
WEEDKLLR(2)	NONE	GLYPHOS	NONE	GLYPHOS
FUNGCIDE				
NONE	4.55	4.71	4.78	4.90
BENOMYL	4.73	4.82	4.57	4.81

NEMACIDE	NONE		ALDICARB	
WEEDKLLR(2)	NONE	GLYPHOS	NONE	GLYPHOS
INSCTCDE				
NONE	4.72	4.77	4.62	4.83
CHLORFEN	4.55	4.76	4.72	4.88

WEEDKLLR(1)	NONE		CHLORTOL	
WEEDKLLR(2)	NONE	GLYPHOS	NONE	GLYPHOS
FUNGCIDE				
NONE	4.58	4.78	4.74	4.82
BENOMYL	4.61	4.62	4.68	5.01

WEEDKLLR(1)	NONE		CHLORTOL	
WEEDKLLR(2)	NONE	GLYPHOS	NONE	GLYPHOS
INSCTCDE				
NONE	4.68	4.70	4.66	4.90
CHLORFEN	4.51	4.71	4.76	4.93

WEEDKLLR(1)	NONE		CHLORTOL	
WEEDKLLR(2)	NONE	GLYPHOS	NONE	GLYPHOS
NEMACIDE				
NONE	4.44	4.62	4.83	4.91
ALDICARB	4.75	4.79	4.60	4.92

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

ONE FACTOR TABLES	0.101
TWO FACTOR TABLES	0.143
THREE FACTOR TABLES	0.202

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP	6	0.286	6.0

GRAIN MEAN DM% 82.5

PLOT AREA HARVESTED 0.00075

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80/R/CS/165

SCLEROTINIA CONTROL

Object: To study the effects of two fungicides and paraquat on the incidence of Sclerotinia and on yield of red and white clover - Little Knott I.

Sponsor: J.F. Jenkyn.

The third year of treatments, red and white clover.

For previous years see 78-79/R/CS/165.

Design: 2 randomised blocks of 30 plots.

Whole plot dimensions: 2.13 x 3.05.

Treatments: All combinations of:-

1. VARIETY		Varieties and their resistance to Sclerotinia trifoliorum:
	BLANC WR	Blanca, white clover, resistant
	SABED WS	Sabeda, white clover, susceptible
	HUNGA RR	Hungaropoly, red clover, resistant
	SABTO RS	Sabtoron, red clover, susceptible
2. TREATMNT		Chemical sprays and timing (cumulative):
	NONE	None
	IPROD E	Iprodione early period, 28 Sept, 1979 and 24 Oct.
	IPROD M	Iprodione mid period, 24 Oct and 29 Nov.
	IPROD L	Iprodione late period, 29 Nov and 31 Dec.
	IPROD A	Iprodione all periods, 28 Sept, 24 Oct, 29 Nov, 31 Dec, 1979, 29 Jan, 1980
	BENOMY A	Benomyl all periods, 28 Sept, 24 Oct, 29 Nov, 31 Dec, 1979, 31 Jan, 1980
	PARAQ W	Paraquat, 29 Nov, 1979 and 1 Apr, 1980

plus two extra treatments (cumulative):

	EXTRA	
	SABED PS	Sabeda, sprayed paraquat in spring, 1 Apr, 1980
	SABTO PS	Sabtoron, sprayed paraquat in spring, 1 Apr

NOTE: Chemical treatments were applied, in 340 l, as follows:- Iprodione at 0.50 kg, benomyl at 0.50 kg (both applied with 'Spreadite', a wetting agent, at 0.25 kg). Paraquat at 0.28 kg ion.

Basal applications: Manures: (0:14:28) at 630 kg. Weedkiller: Propyzamide at 0.70 kg in 340 l.

Cultivations, etc.:- Propyzamide applied: 26 Sept, 1979. PK applied: 22 Nov. Cut: 4 June, 1980, 30 July, 11 Sept.

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80/R/CS/165

1ST CUT (4/6/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	2.86	2.67	4.90	3.43	3.47
IPROD E	2.48	1.59	5.25	4.23	3.39
IPROD M	2.67	2.40	5.17	4.03	3.57
IPROD L	2.69	2.25	5.05	3.97	3.49
IPROD A	2.81	2.74	5.13	4.26	3.73
BENOMY A	2.86	2.75	5.25	4.52	3.84
PARQ W	2.44	1.81	4.12	1.56	2.48
MEAN	2.69	2.32	4.98	3.71	3.42

EXTRA	SABED PS	SABTO PS	MEAN
	2.00	3.34	2.67

GRAND MEAN 3.37

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.418	0.209	0.158	0.418

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.418	12.4

1ST CUT MEAN DM% 18.7

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80/R/CS/165

2ND CUT (30/7/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	2.44	2.51	4.80	3.84	3.40
IPROD E	2.46	2.80	4.95	3.47	3.42
IPROD M	2.46	2.87	4.88	4.11	3.58
IPROD L	2.68	2.82	4.87	3.76	3.53
IPROD A	2.94	2.67	4.75	3.72	3.52
BENOMY A	3.41	2.86	4.78	5.27	4.08
PARQ W	2.59	2.93	4.74	3.53	3.45
MEAN	2.71	2.78	4.82	3.96	3.57

EXTRA	SABED PS	SABTO PS	MEAN
	2.82	3.64	3.23

GRAND MEAN 3.55

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.325	0.163	0.123	0.325

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.325	9.2

2ND CUT MEAN DM% 14.1

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80/R/CS/165
3RD CUT (11/9/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	1.91	1.59	1.16	0.93	1.40
IPROD E	1.61	1.19	1.38	0.87	1.26
IPROD M	1.53	1.42	1.41	1.06	1.35
IPROD L	1.38	1.40	1.72	1.04	1.38
IPROD A	1.42	1.60	1.60	1.02	1.41
BENOMY A	1.58	1.47	1.57	1.33	1.49
PARQ W	1.59	1.48	1.80	1.02	1.47
MEAN	1.57	1.45	1.52	1.04	1.40

EXTRA	SABED PS	SABTO PS	MEAN
	1.45	0.98	1.22

GRAND MEAN 1.38

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.260	0.130	0.098	0.260

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.260	18.8

3RD CUT MEAN DM% 20.5

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80/R/CS/165

TOTAL OF 3 CUTS DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY TREATMNT	BLANC WR	SABED WS	HUNGA RR	SABTO RS	MEAN
NONE	7.21	6.78	10.86	8.20	8.26
IPROD E	6.55	5.58	11.59	8.58	8.07
IPROD M	6.65	6.69	11.46	9.20	8.50
IPROD L	6.75	6.47	11.63	8.77	8.41
IPROD A	7.17	7.01	11.49	9.00	8.67
BENOMY A	7.85	7.09	11.60	11.12	9.41
PARQ W	6.62	6.22	10.67	6.11	7.40
MEAN	6.97	6.55	11.33	8.71	8.39

EXTRA	SABED PS	SABTO PS	MEAN
	6.27	7.97	7.12

GRAND MEAN 8.30

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	TREATMNT	VARIETY	TREATMNT VARIETY & EXTRA
SED	0.712	0.356	0.269	0.712

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	29	0.712	8.6

TOTAL OF 3 CUTS MEAN DM% 17.8

PLOT AREA HARVESTED 0.00028

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80/W/CS/174

SOWING DATES AND CCN

Object: To study the residual effects of sowing date, a nematicide, a soil sterilant and previous cropping on the incidence of cereal cyst-nematode (Heterodera avenae) (CCN) and on the yield of s. oats in a soil known to contain a fungal parasite of the nematode - Woburn, Butt Close.

Sponsor: B.R. Kerry.

The sixth year, s. oats.

For previous years see 75/W/M/1 and 76-79/W/CS/174.

Design: Single replicate of 36 plots split into 2.

Whole plot dimensions: 2.13 x 6.70.

Treatments: All combinations of:-

Whole plots

1.	CROP(76)	Crop (cumulative 1975-76):
	WHEAT	
	BARLEY	
	OATS	
2.	SOW DATE(76)	Sowing date (cumulative 1975-76):
	AUTUMN	
	SPRING	
3.	NEMACIDE(78)	Nematicide (cumulative 1975-78):
	NONE	None
	OXAMYL	Oxamyl at 8.8 kg
4.	CROP(78)	Crop in 1977 & 1978 (all spring sown)(all spring oats in 1979):
	WHEAT	
	BARLEY	
	OATS	

Sub plots

5.	STERILNT	Sterilant:
	NONE	None
	FORMALIN	Formalin at 3000 l in 109000 l. To SOW DATE SPRING in 1976, 1977 and 1978 only.

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80/W/CS/174

Basal applications: Manures: (20:10:10) at 400 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in 280 l) applied twice, with fungicide on the second occasion. Fungicide: Tridemorph at 0.53 kg. Irrigation (mm water):

12 June	20
23 July	10
Total	30

Seed: Manod, sown at 170 kg.

Cultivations, etc.:- Ploughed: 5 Nov, 1979. Heavy spring-tine cultivated: 28 Feb, 1980. Spring-tine cultivated with crumbler attached, seed sown: 24 Mar. Missing rows resown, by hand: 17 Apr. Weedkillers applied: 25 Apr, 13 May. Fungicide applied: 13 May. Combine harvested: 27 Aug.

NOTE: Numbers of cereal cyst-nematodes in soil in April were counted.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SOW DATE(76) / CROP(76)	AUTUMN	SPRING	MEAN
WHEAT	4.07	4.10	4.09
BARLEY	3.57	4.19	3.88
OATS	3.87	4.03	3.95
MEAN	3.83	4.11	3.97

NEMACIDE(78) / CROP(76)	NONE	OXAMYL	MEAN
WHEAT	4.05	4.13	4.09
BARLEY	3.63	4.13	3.88
OATS	3.98	3.92	3.95
MEAN	3.89	4.06	3.97

NEMACIDE(78) / SOW DATE(76)	NONE	OXAMYL	MEAN
AUTUMN	3.89	3.78	3.83
SPRING	3.88	4.34	4.11
MEAN	3.89	4.06	3.97

CROP(78) / CROP(76)	WHEAT	BARLEY	OATS	MEAN
WHEAT	4.13	4.27	3.86	4.09
BARLEY	3.57	3.87	4.20	3.88
OATS	4.16	3.93	3.76	3.95
MEAN	3.95	4.02	3.94	3.97

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80/W/CS/174

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

CROP(78) / SOW DATE(76)	WHEAT	BARLEY	OATS	MEAN
AUTUMN	3.73	3.84	3.93	3.83
SPRING	4.18	4.21	3.95	4.11
MEAN	3.95	4.02	3.94	3.97

CROP(78) / NEMACIDE(78)	WHEAT	BARLEY	OATS	MEAN
NONE	3.80	3.87	3.98	3.89
OXAMYL	4.10	4.18	3.90	4.06
MEAN	3.95	4.02	3.94	3.97

STERILNT / CROP(76)	NONE	FORMALIN	MEAN
WHEAT	4.21	3.97	4.09
BARLEY	3.90	3.86	3.88
OATS	3.96	3.94	3.95
MEAN	4.02	3.92	3.97

STERILNT / SOW DATE(76)	NONE	FORMALIN	MEAN
AUTUMN	3.82	3.85	3.83
SPRING	4.22	4.00	4.11
MEAN	4.02	3.92	3.97

STERILNT / NEMACIDE(78)	NONE	FORMALIN	MEAN
NONE	3.93	3.85	3.89
OXAMYL	4.12	4.00	4.06
MEAN	4.02	3.92	3.97

STERILNT / CROP(78)	NONE	FORMALIN	MEAN
WHEAT	4.01	3.89	3.95
BARLEY	3.99	4.06	4.02
OATS	4.06	3.82	3.94
MEAN	4.02	3.92	3.97

SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(78)	NONE	OXAMYL	NONE	OXAMYL
CROP(76)				
WHEAT	4.07	4.07	4.03	4.18
BARLEY	3.41	3.72	3.86	4.53
OATS	4.19	3.55	3.76	4.30

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SOW DATE(76)	AUTUMN			SPRING		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	4.06	4.16	3.98	4.19	4.38	3.74
BARLEY	2.94	3.48	4.28	4.20	4.26	4.12
OATS	4.19	3.89	3.53	4.14	3.98	3.98

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	4.01	4.10	4.03	4.24	4.44	3.70
BARLEY	3.26	3.65	3.99	3.88	4.09	4.41
OATS	4.13	3.86	3.93	4.19	4.00	3.58

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	3.68	3.90	4.09	3.78	3.78	3.78
SPRING	3.92	3.84	3.88	4.43	4.57	4.02

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	4.17	3.97	4.24	3.97
BARLEY	3.61	3.52	4.19	4.20
OATS	3.69	4.05	4.24	3.83

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	4.15	3.95	4.27	3.99
BARLEY	3.64	3.63	4.15	4.10
OATS	3.99	3.96	3.93	3.91

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	3.81	3.97	3.84	3.72
SPRING	4.05	3.72	4.40	4.28

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
CROP(76)						
WHEAT	4.21	4.04	4.37	4.17	4.04	3.69
BARLEY	3.73	3.42	3.71	4.03	4.25	4.14
OATS	4.11	4.22	3.89	3.97	3.89	3.63

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)						
AUTUMN	3.81	3.65	3.69	3.99	3.96	3.90
SPRING	4.22	4.13	4.29	4.12	4.16	3.74

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(78)						
NONE	3.86	3.74	3.81	3.93	4.10	3.86
OXAMYL	4.17	4.04	4.17	4.18	4.01	3.78

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABL E	CROP(76)	SOW DATE(76)	NEMACIDE(78)	CROP(78)
SED	0.175	0.143	0.143	0.175

TABLE	STERILNT	CROP(76) SOW DATE(76)	CROP(76) NEMACIDE(78)	SOW DATE(76) NEMACIDE(78)
SED	0.087	0.248	0.248	0.202

TABLE	CROP(76) CROP(78)	SOW DATE(76) CROP(78)	NEMACIDE(78) CROP(78)	CROP(76) STERILNT
SED	0.304	0.248	0.248	0.205
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76)				0.151

TABLE	SOW DATE(76) STERILNT	NEMACIDE(78) STERILNT	CROP(78) STERILNT	CROP(76) SOW DATE(76) NEMACIDE(78)
SED	0.168	0.168	0.205	0.351
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOW DATE(76)	0.123			
NEMACIDE(78)		0.123		
CROP(78)			0.151	

TABLE	CROP(76) SOW DATE(76) CROP(78)	CROP(76) NEMACIDE(78) CROP(78)	SOW DATE(76) NEMACIDE(78) CROP(78)	CROP(76) SOW DATE(76) STERILNT
SED	0.429	0.429	0.351	0.290
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76).SOW DATE(76)				0.214

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GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	CROP(76) NEMACIDE(78) STERILNT	SOW DATE(76) NEMACIDE(78) STERILNT	CROP(76) CROP(78) STERILNT	SOW DATE(76) CROP(78) STERILNT
SED	0.290	0.237	0.356	0.290
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
CROP(76).NEMACIDE(78)	0.214			
SOW DATE(76).NEMACIDE(78)		0.175		
CROP(76).CROP(78)			0.262	
SOW DATE(76).CROP(78)				0.214

TABLE	NEMACIDE(78) CROP(78) STERILNT
SED	0.290
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
NEMACIDE(78).CROP(78)	0.214

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP	4	0.429	10.8
WP.SP	16	0.370	9.3

GRAIN MEAN DM% 78.6

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80/W/CS/174

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

SOW DATE(76) / CROP(76)	AUTUMN	SPRING	MEAN
WHEAT	2.60	2.68	2.64
BARLEY	2.32	2.43	2.38
OATS	2.45	2.63	2.54
MEAN	2.46	2.58	2.52

NEMACIDE(78) / CROP(76)	NONE	OXAMYL	MEAN
WHEAT	2.63	2.66	2.64
BARLEY	2.34	2.41	2.38
OATS	2.48	2.60	2.54
MEAN	2.48	2.55	2.52

NEMACIDE(78) / SOW DATE(76)	NONE	OXAMYL	MEAN
AUTUMN	2.55	2.36	2.46
SPRING	2.42	2.75	2.58
MEAN	2.48	2.55	2.52

CROP(78) / CROP(76)	WHEAT	BARLEY	OATS	MEAN
WHEAT	2.81	2.71	2.40	2.64
BARLEY	2.20	2.28	2.64	2.38
OATS	2.72	2.86	2.04	2.54
MEAN	2.58	2.62	2.36	2.52

CROP(78) / SOW DATE(76)	WHEAT	BARLEY	OATS	MEAN
AUTUMN	2.60	2.31	2.46	2.46
SPRING	2.56	2.92	2.26	2.58
MEAN	2.58	2.62	2.36	2.52

CROP(78) / NEMACIDE(78)	WHEAT	BARLEY	OATS	MEAN
NONE	2.50	2.54	2.41	2.48
OXAMYL	2.66	2.70	2.31	2.55
MEAN	2.58	2.62	2.36	2.52

STERILNT / CROP(76)	NONE	FORMALIN	MEAN
WHEAT	2.83	2.45	2.64
BARLEY	2.36	2.39	2.38
OATS	2.55	2.52	2.54
MEAN	2.58	2.45	2.52

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80/W/CS/174

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

STERILNT SOW DATE(76)	NONE	FORMALIN	MEAN
AUTUMN	2.44	2.47	2.46
SPRING	2.73	2.43	2.58
MEAN	2.58	2.45	2.52

STERILNT NEMACIDE(78)	NONE	FORMALIN	MEAN
NONE	2.64	2.33	2.48
OXAMYL	2.53	2.58	2.55
MEAN	2.58	2.45	2.52

STERILNT CROP(78)	NONE	FORMALIN	MEAN
WHEAT	2.59	2.56	2.58
BARLEY	2.67	2.57	2.62
OATS	2.49	2.23	2.36
MEAN	2.58	2.45	2.52

SOW DATE(76)	AUTUMN		SPRING	
NEMACIDE(78)	NONE	OXAMYL	NONE	OXAMYL
CROP(76)				
WHEAT	2.59	2.61	2.66	2.71
BARLEY	2.38	2.26	2.30	2.56
OATS	2.67	2.23	2.28	2.97

SOW DATE(76)	AUTUMN			SPRING		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	3.09	2.47	2.23	2.53	2.96	2.56
BARLEY	1.92	1.96	3.07	2.49	2.59	2.22
OATS	2.77	2.50	2.07	2.66	3.21	2.00

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
CROP(76)						
WHEAT	2.90	2.61	2.36	2.72	2.81	2.43
BARLEY	2.05	2.23	2.75	2.36	2.33	2.54
OATS	2.54	2.77	2.12	2.90	2.94	1.96

NEMACIDE(78)	NONE			OXAMYL		
CROP(78)	WHEAT	BARLEY	OATS	WHEAT	BARLEY	OATS
SOW DATE(76)						
AUTUMN	2.60	2.27	2.77	2.59	2.35	2.15
SPRING	2.39	2.80	2.05	2.73	3.04	2.47

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80/W/CS/174

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

SOW DATE(76)	AUTUMN		SPRING	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	2.68	2.52	2.98	2.38
BARLEY	2.33	2.31	2.40	2.47
OATS	2.30	2.60	2.80	2.45

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
CROP(76)				
WHEAT	3.02	2.23	2.64	2.68
BARLEY	2.44	2.24	2.29	2.53
OATS	2.44	2.51	2.66	2.54

NEMACIDE(78)	NONE		OXAMYL	
STERILNT	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)				
AUTUMN	2.52	2.57	2.35	2.38
SPRING	2.75	2.08	2.70	2.79

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
CROP(76)						
WHEAT	2.86	2.77	2.98	2.45	2.66	2.13
BARLEY	2.15	2.25	2.14	2.42	2.80	2.49
OATS	2.77	2.67	2.88	2.83	2.00	2.08

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
SOW DATE(76)						
AUTUMN	2.63	2.57	2.13	2.50	2.56	2.36
SPRING	2.56	2.56	3.21	2.63	2.42	2.11

CROP(78)	WHEAT		BARLEY		OATS	
STERILNT	NONE	FORMALIN	NONE	FORMALIN	NONE	FORMALIN
NEMACIDE(78)						
NONE	2.71	2.28	2.54	2.54	2.66	2.16
OXAMYL	2.48	2.84	2.80	2.59	2.31	2.31

STRAW MEAN DM% 72.4

SUB PLOT AREA HARVESTED 0.00041

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80/R/CS/200 and 80/W/CS/200

FACTORS AFFECTING YIELD

Object: To study some of the factors limiting yield of grass, clover and lucerne - Rothamsted (R), Pastures and Woburn (W), Butt Furlong.

Sponsors: J.M. Day, I.F. Henderson, J.F. Jenkyn, A.E. Johnston, B.J. Legg, J. McEwen, R.T. Plumb, A.M. Spaull, J.F. Witty.

The fourth year, ryegrass, white clover, lucerne.

For previous years see 77-79/R&W/CS/200.

Design: Single replicate of 2 plots split into 50.

Whole plot dimensions: Pastures (R): 23.8 x 24.5.
Butt Furlong (W): 22.3 x 24.5.

Treatments: Combinations of:-

Whole plots

1. IRRIGATN — Irrigation:

NONE	None
FULL	Irrigated to reduce a soil moisture deficit of 25 mm to zero

Sub plots

2. TREATMNT — Treatments, combinations of:

Species:

- Ryegrass, S.23, (RG)
- Ryegrass, S.23 + Clover, Blanca (GB)
- Ryegrass, S.23 + Clover, S.100 (GS)
- Clover, Blanca (CL)
- Lucerne, Vertus (LU)

Cutting frequencies:

- Three times (3)
- Six times (6)

Amounts of nitrogen fertiliser (kg N total per annum, applied as (25:0:16)):

- 0, 100, 200, 300, 400, 500, 600 (N0, N1, N2, N3, N4, N5, N6)

Times of applying nitrogen fertiliser:

- Not applied (--), N0 only
- Divided equally between cuts (DE)
- In spring only (SP)
- Half in spring, half in summer (SS)

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80/R/CS/200 and 80/W/CS/200

Control of pathogens:

None (-)
Controlled (C)

The following combinations are tested:

RG6N0---	GB3N0--- (duplicated)	CL3N0--- (duplicated)
RG6N1DE-	GB3N1DE-	CL3N2DE- "
RG6N2DE-	GB3N2DE-	CL3N0--C "
RG6N3DE-	GB3N3DE-	CL3N2DEC "
RG6N4DE-	GB3N4DE-	
RG6N5DE-		LU3N0--- "
RG6N6DE-	GB3N0--C	LU3N0--C "
	GB3N1DEC	
GB6N0---	GB3N2DEC	
GB6N1DE-	GB3N3DEC	
GB6N2DE-	GB3N4DEC	
GB6N3DE-		
GB6N4DE-	GB3N1SP- (duplicated)	
	GB3N1SS- "	
GS6N0---	GB3N2SS "	
GS6N1DE-		
GS6N2DE-	RG3N2DE- "	
GS6N3DE-	RG3N2DEC "	
GS6N4DE-		

NOTES: (1) Pathogen control consisted of:- (1) Aldicarb at 10 kg applied in the spring except to LU which received phorate at 5.0 kg, (2) benomyl foliar spray at 0.56 kg + phorate at 5.0 kg, applied as granules, after each cut, (3) four additional benomyl foliar sprays at 0.56 kg in winter, (4) Methiocarb at 0.48 kg, as pellets, applied at monthly intervals from October.

(2) Irrigation was applied as follows (mm water):

Pastures (R)

9 May	25
17 May	25
19 May	25
24 May	25
4 June	25
13 June	25
7 Aug	12.5
29 Aug	12.5
8 Sept	12.5
Total	187.5

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80/R/CS/200 and 80/W/CS/200

Butt Furlong (W)

6 May	25
7 May	12.5
15 May	25
19 May	25
23 May	25
12 June	25
23 July	12.5
7 Aug	12.5
28 Aug	12.5
3 Sept	12.5
Total	187.5

(3) NO plots received 192 kg K20, as muriate of potash, after the fourth cutting occasion.

Standard applications:
Pastures (R) All plots: Manures: (0:14:28) at 1070 kg. Weedkillers: Propyzamide at 0.70 kg in 700 l to CL and LU plots only. Dicamba with mecoprop and MCPA (as 'Tetralex Plus' at 4.2 l) in 340 l to RG plots only.
Butt Furlong (W) All plots: Manures: Magnesian limestone at 2.5 t, (0:14:28) at 1070 kg. Propyzamide at 0.70 kg in 700 l to CL and LU plots only. Dicamba with mecoprop and MCPA (as 'Tetralex Plus' at 4.2 l) in 340 l to RG plots only.

Seed: S23 Perennial ryegrass alone sown at 20 kg.
S23 Perennial ryegrass sown at 10 kg either with Blanca white clover sown at 4 kg or with S.100 white clover at 4 kg.
Blanca white clover alone sown at 4 kg.
Lucerne, Vertus sown at 10 kg, inoculated with Rhizobium.

Pastures (R) sown: 20 May, 1977.
Butt Furlong (W) sown: 23 May, 1977.

Cultivations, etc.:-
Pastures (R): Propyzamide applied: 5 Oct, 1979. PK applied: 12 Oct. Benomyl applied: 1 Nov, 4 Dec, 7 Jan, 1980, 11 Feb. NK applied: 4 Mar. NK, benomyl and phorate applied: 13 May, 10 June, 8 July, 5 Aug, 2 Sept. Benomyl and phorate applied: 30 Sept. Aldicarb applied to all C plots except LU and phorate to C plots of LU: 11 Mar. Weedkillers applied to RG plots: 11 Apr. '6 cut' plots cut: 13 May, 10 June, 8 July, 5 Aug, 2 Sept, 30 Sept. '3 cut' plots cut: 10 June, 5 Aug, 30 Sept.
Butt Furlong (W): Propyzamide applied: 5 Oct, 1979. Magnesian limestone applied: 31 Oct. Benomyl applied: 1 Nov, 4 Dec, 8 Jan, 1980, 12 Feb. PK applied: 11 Feb. NK applied: 4 Mar. Aldicarb applied to all C plots except LU and phorate to C plots of LU: 7 Mar. Weedkillers applied to RG plots: 11 Apr. NK, benomyl and phorate applied: 14 May, 11 June, 9 July, 6 Aug, 3 Sept. Benomyl and phorate applied: 1 Oct. '6 cut' plots cut: 14 May, 11 June, 9 July, 6 Aug, 3 Sept, 1 Oct. '3 cut' plots cut: 11 June, 6 Aug, 1 Oct.

NOTE: Assessments of pests and diseases were made during the season. Nitrogen percentages of crop produce were measured.

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80/R/CS/200 PASTURES (R)

1ST CUTTING OCCASION (13/5/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.10	0.09	0.09
RG6N1DE-	0.09	0.08	0.09
RG6N2DE-	0.24	0.53	0.38
RG6N3DE-	0.89	1.13	1.01
RG6N4DE-	2.38	2.40	2.39
RG6N5DE-	1.80	3.41	2.61
RG6N6DE-	2.46	3.62	3.04
GB6N0---	2.10	2.18	2.14
GB6N1DE-	2.54	2.29	2.42
GB6N2DE-	2.75	2.67	2.71
GB6N3DE-	2.70	2.86	2.78
GB6N4DE-	2.89	2.62	2.75
GS6N0---	1.10	2.37	1.74
GS6N1DE-	1.20	2.42	1.81
GS6N2DE-	1.48	2.50	1.99
GS6N3DE-	2.22	2.90	2.56
GS6N4DE-	2.54	3.17	2.86
MEAN	1.73	2.19	1.96

1ST CUTTING OCCASION MEAN DM% 23.0

* USE STANDARD ERRORS ON FOLLOWING PAGES ONLY TO COMPARE TREATMNT LEVELS
GB3N0---,GB3N1SP-,GB3N1SS-,GB3N2SS-,RG3N2DE-,RG3N2DEC,
CL3N0---,CL3N2DE-,CL3N0--C,CL3N2DEC,LU3N0---,LU3N0--C
AND WITHIN THE SAME LEVEL OF IRRIGATN.

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80/R/CS/200 PASTURES (R)
2ND CUTTING OCCASION (10/6/80) DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.31	0.60	0.45
RG6N1DE-	0.82	1.16	0.99
RG6N2DE-	1.78	2.25	2.01
RG6N3DE-	1.78	3.37	2.58
RG6N4DE-	2.01	4.03	3.02
RG6N5DE-	2.52	2.72	2.62
RG6N6DE-	2.21	3.85	3.03
GB6NO---	1.76	3.06	2.41
GB6N1DE-	1.98	3.51	2.74
GB6N2DE-	2.16	3.81	2.99
GB6N3DE-	2.77	2.94	2.86
GB6N4DE-	2.44	4.31	3.37
GS6NO---	1.62	2.88	2.25
GS6N1DE-	2.21	3.50	2.85
GS6N2DE-	2.32	2.77	2.55
GS6N3DE-	2.14	3.17	2.65
GS6N4DE-	2.36	4.17	3.26
GB3NO---	3.97	4.57	4.27
GB3N1DE-	4.21	3.61	3.91
GB3N2DE-	4.04	4.18	4.11
GB3N3DE-	4.35	5.95	5.15
GB3N4DE-	4.50	5.35	4.93
GB3NO--C	4.76	6.52	5.64
GB3N1DEC	6.58	6.97	6.77
GB3N2DEC	6.24	6.34	6.29
GB3N3DEC	7.56	6.82	7.19
GB3N4DEC	7.58	7.33	7.45
GB3N1SP-	5.47	6.14	5.80
GB3N1SS-	4.72	5.68	5.20
GB3N2SS-	5.23	5.87	5.55
RG3N2DE-	2.81	4.88	3.85
RG3N2DEC	4.39	5.55	4.97
CL3NO---	2.27	4.10	3.19
CL3N2DE-	1.98	3.40	2.69
CL3NO--C	2.55	4.30	3.42
CL3N2DEC	2.56	4.57	3.57
LU3NO---	7.01	7.43	7.22
LU3NO--C	6.63	7.59	7.11
MEAN	3.64	4.67	4.16

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.368	0.521

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.521	12.5

2ND CUTTING OCCASION MEAN DM% 16.9

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80/R/CS/200 PASTURES (R)

3RD CUTTING OCCASION (8/7/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.19	0.36	0.28
RG6N1DE-	0.37	0.46	0.41
RG6N2DE-	1.30	1.09	1.19
RG6N3DE-	1.34	1.20	1.27
RG6N4DE-	1.75	1.28	1.52
RG6N5DE-	2.32	1.91	2.12
RG6N6DE-	1.95	1.88	1.91
GB6NO---	1.65	1.71	1.68
GB6N1DE-	1.88	1.73	1.81
GB6N2DE-	1.79	1.54	1.66
GB6N3DE-	1.93	1.54	1.73
GB6N4DE-	1.84	1.69	1.77
GS6NO---	0.58	1.29	0.94
GS6N1DE-	1.28	1.56	1.42
GS6N2DE-	1.35	1.59	1.47
GS6N3DE-	1.83	1.43	1.63
GS6N4DE-	1.74	1.25	1.49
MEAN	1.48	1.38	1.43

3RD CUTTING OCCASION MEAN DM% 14.4

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80/R/CS/200 PASTURES (R)
4TH CUTTING OCCASION (5/8/80) DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.08	0.23	0.15
RG6N1DE-	0.34	0.47	0.41
RG6N2DE-	1.53	1.47	1.50
RG6N3DE-	2.82	2.18	2.50
RG6N4DE-	3.76	3.23	3.49
RG6N5DE-	3.60	2.84	3.22
RG6N6DE-	3.75	2.56	3.16
GB6NO---	2.32	2.13	2.22
GB6N1DE-	2.63	2.35	2.49
GB6N2DE-	2.82	2.44	2.63
GB6N3DE-	2.73	2.48	2.60
GB6N4DE-	3.84	2.51	3.18
GS6NO---	1.77	2.19	1.98
GS6N1DE-	1.85	2.41	2.13
GS6N2DE-	2.63	2.59	2.61
GS6N3DE-	2.95	2.71	2.83
GS6N4DE-	3.60	2.68	3.14
GB3NO---	3.46	3.23	3.34
GB3N1DE-	4.25	3.13	3.69
GB3N2DE-	3.38	2.81	3.10
GB3N3DE-	4.30	3.12	3.71
GB3N4DE-	5.50	3.40	4.45
GB3NO--C	3.78	4.18	3.98
GB3N1DEC	4.63	4.08	4.36
GB3N2DEC	5.44	4.44	4.94
GB3N3DEC	5.05	4.94	4.99
GB3N4DEC	4.71	5.29	5.00
GB3N1SP-	3.85	3.60	3.72
GB3N1SS-	3.63	3.09	3.36
GB3N2SS-	3.38	3.12	3.25
RG3N2DE-	4.14	3.28	3.71
RG3N2DEC	4.85	3.65	4.25
CL3NO---	2.66	2.68	2.67
CL3N2DE-	2.63	2.63	2.63
CL3NO--C	3.66	3.89	3.78
CL3N2DEC	4.63	3.42	4.03
LU3NO---	5.97	5.54	5.75
LU3NO--C	5.75	5.49	5.62
MEAN	3.63	3.20	3.41

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.275	0.389

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.389	11.4

4TH CUTTING OCCASION MEAN DM% 16.7

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80/R/CS/200 PASTURES (R)

5TH CUTTING OCCASION (2/9/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.06	0.30	0.18
RG6N1DE-	0.41	0.39	0.40
RG6N2DE-	1.21	0.76	0.99
RG6N3DE-	1.19	1.54	1.36
RG6N4DE-	1.50	2.41	1.95
RG6N5DE-	1.93	2.09	2.01
RG6N6DE-	0.93	1.79	1.36
GB6NO---	1.33	1.33	1.33
GB6N1DE-	1.51	1.57	1.54
GB6N2DE-	1.39	1.27	1.33
GB6N3DE-	1.41	1.14	1.28
GB6N4DE-	1.14	1.45	1.30
GS6NO---	1.09	1.18	1.13
GS6N1DE-	1.28	1.23	1.26
GS6N2DE-	1.14	1.49	1.31
GS6N3DE-	1.33	1.72	1.52
GS6N4DE-	1.73	1.94	1.83
MEAN	1.21	1.39	1.30

5TH CUTTING OCCASION MEAN DM% 15.1

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80/R/CS/200 PASTURES (R)
6TH CUTTING OCCASION (30/9/80) DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.07	0.24	0.15
RG6N1DE-	0.29	0.58	0.44
RG6N2DE-	1.06	1.20	1.13
RG6N3DE-	1.30	1.67	1.48
RG6N4DE-	1.17	1.80	1.49
RG6N5DE-	0.98	1.54	1.26
RG6N6DE-	0.94	1.88	1.41
GB6N0---	0.56	1.10	0.83
GB6N1DE-	0.40	1.09	0.75
GB6N2DE-	0.58	1.37	0.98
GB6N3DE-	0.55	1.32	0.94
GB6N4DE-	0.72	1.23	0.97
GS6N0---	1.00	1.09	1.05
GS6N1DE-	1.02	1.28	1.15
GS6N2DE-	1.17	1.41	1.29
GS6N3DE-	1.17	1.41	1.29
GS6N4DE-	1.33	1.19	1.26
GB3N0---	1.53	1.81	1.67
GB3N1DE-	1.99	1.54	1.76
GB3N2DE-	1.85	1.89	1.87
GB3N3DE-	2.23	2.44	2.33
GB3N4DE-	1.95	2.12	2.03
GB3N0--C	1.33	2.39	1.86
GB3N1DEC	1.75	2.34	2.05
GB3N2DEC	1.74	2.57	2.15
GB3N3DEC	2.07	2.01	2.04
GB3N4DEC	2.24	2.74	2.49
GB3N1SP-	1.43	2.11	1.77
GB3N1SS-	1.83	1.93	1.88
GB3N2SS-	1.91	1.96	1.94
RG3N2DE-	2.72	2.81	2.77
RG3N2DEC	2.66	2.87	2.77
CL3N0---	1.13	1.54	1.33
CL3N2DE-	1.28	1.87	1.57
CL3N0--C	1.22	2.17	1.70
CL3N2DEC	1.85	2.18	2.02
LU3N0---	2.50	2.36	2.43
LU3N0--C	2.87	2.86	2.86
MEAN	1.55	1.89	1.72

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.140	0.198

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.198	11.5

6TH CUTTING OCCASION MEAN DM% 16.4

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80/R/CS/200 PASTURES (R)
TOTAL OF 6 CUTTING OCCASIONS DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.81	1.82	1.31
RG6N1DE-	2.32	3.14	2.73
RG6N2DE-	7.13	7.29	7.21
RG6N3DE-	9.31	11.09	10.20
RG6N4DE-	12.56	15.15	13.85
RG6N5DE-	13.15	14.51	13.83
RG6N6DE-	12.24	15.58	13.91
GB6NO---	9.72	11.51	10.62
GB6N1DE-	10.93	12.54	11.74
GB6N2DE-	11.49	13.10	12.29
GB6N3DE-	12.09	12.28	12.19
GB6N4DE-	12.87	13.82	13.34
GS6NO---	7.16	11.01	9.08
GS6N1DE-	8.84	12.40	10.62
GS6N2DE-	10.09	12.36	11.23
GS6N3DE-	11.64	13.34	12.49
GS6N4DE-	13.29	14.39	13.84
GB3NO---	8.96	9.60	9.28
GB3N1DE-	10.45	8.28	9.37
GB3N2DE-	9.28	8.89	9.08
GB3N3DE-	10.88	11.52	11.20
GB3N4DE-	11.94	10.87	11.41
GB3NO--C	9.87	13.09	11.48
GB3N1DEC	12.95	13.40	13.18
GB3N2DEC	13.43	13.35	13.39
GB3N3DEC	14.68	13.77	14.22
GB3N4DEC	14.53	15.36	14.94
GB3N1SP-	10.74	11.84	11.29
GB3N1SS-	10.19	10.71	10.45
GB3N2SS-	10.52	10.95	10.74
RG3N2DE-	9.67	10.98	10.32
RG3N2DEC	11.90	12.07	11.99
CL3NO---	6.05	8.33	7.19
CL3N2DE-	5.90	7.91	6.90
CL3NO--C	7.44	10.36	8.90
CL3N2DEC	9.04	10.18	9.61
LU3NO---	15.47	15.33	15.40
LU3NO--C	15.25	15.93	15.59
MEAN	10.32	11.44	10.88

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.535	0.757

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.757	7.0

TOTAL OF 6 CUTTING OCCASIONS MEAN DM% 16.8 SUB PLOT AREA HARVESTED 0.00038

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80/W/CS/200 BUTT FURLONG (W)

1ST CUTTING OCCASION (14/5/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.10	0.17	0.13
RG6N1DE-	0.29	0.34	0.32
RG6N2DE-	0.36	0.73	0.54
RG6N3DE-	0.86	1.42	1.14
RG6N4DE-	1.67	1.98	1.82
RG6N5DE-	1.76	2.84	2.30
RG6N6DE-	2.51	2.66	2.58
GB6N0---	1.46	2.71	2.09
GB6N1DE-	2.05	2.45	2.25
GB6N2DE-	2.02	2.29	2.16
GB6N3DE-	1.74	3.11	2.42
GB6N4DE-	2.26	2.63	2.45
GS6N0---	0.52	2.62	1.57
GS6N1DE-	0.89	2.08	1.49
GS6N2DE-	1.07	2.13	1.60
GS6N3DE-	1.48	1.68	1.58
GS6N4DE-	2.07	2.62	2.35
MEAN	1.36	2.03	1.69

1ST CUTTING OCCASION MEAN DM% 27.0

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80/W/CS/200 BUTT FURLONG (W)
2ND CUTTING OCCASION (11/6/80) DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.19	0.61	0.40
RG6N1DE-	0.50	1.34	0.92
RG6N2DE-	1.07	2.09	1.58
RG6N3DE-	1.47	3.44	2.45
RG6N4DE-	2.00	4.08	3.04
RG6N5DE-	2.22	4.49	3.36
RG6N6DE-	2.45	4.35	3.40
GB6NO---	1.33	2.95	2.14
GB6N1DE-	1.64	3.04	2.34
GB6N2DE-	1.34	3.04	2.19
GB6N3DE-	1.84	2.88	2.36
GB6N4DE-	2.08	3.10	2.59
GS6NO---	1.12	2.91	2.02
GS6N1DE-	1.41	3.58	2.50
GS6N2DE-	1.47	3.30	2.38
GS6N3DE-	1.75	4.17	2.96
GS6N4DE-	2.15	3.82	2.99
GB3NO---	2.64	4.30	3.47
GB3N1DE-	3.01	4.12	3.57
GB3N2DE-	3.45	4.97	4.21
GB3N3DE-	2.85	4.80	3.82
GB3N4DE-	3.44	4.53	3.99
GB3NO--C	3.85	6.42	5.14
GB3N1DEC	4.58	6.02	5.30
GB3N2DEC	5.07	8.27	6.67
GB3N3DEC	4.70	6.62	5.66
GB3N4DEC	5.61	7.34	6.47
GB3N1SP-	3.11	4.59	3.85
GB3N1SS-	3.41	4.21	3.81
GB3N2SS-	3.52	4.24	3.88
RG3N2DE-	1.80	3.99	2.89
RG3N2DEC	2.93	5.32	4.13
CL3NO---	1.07	3.92	2.49
CL3N2DE-	1.48	3.47	2.48
CL3NO--C	2.33	5.38	3.86
CL3N2DEC	2.99	5.24	4.11
LU3NO---	6.18	7.20	6.69
LU3NO--C	6.45	7.29	6.87
MEAN	2.77	4.49	3.63

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.351	0.497

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.497	13.7

2ND CUTTING OCCASION MEAN DM% 15.2

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80/W/CS/200 BUTT FURLONG (W)

3RD CUTTING OCCASION (9/7/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.23	0.27	0.25
RG6N1DE-	0.62	0.79	0.70
RG6N2DE-	1.51	1.21	1.36
RG6N3DE-	2.52	1.37	1.95
RG6N4DE-	3.27	1.77	2.52
RG6N5DE-	3.04	1.92	2.48
RG6N6DE-	3.58	2.21	2.89
GB6N0---	2.03	1.84	1.94
GB6N1DE-	2.41	1.71	2.06
GB6N2DE-	2.47	1.94	2.20
GB6N3DE-	2.75	1.76	2.25
GB6N4DE-	2.82	1.62	2.22
GS6N0---	0.71	1.72	1.21
GS6N1DE-	0.95	1.55	1.25
GS6N2DE-	2.07	1.55	1.81
GS6N3DE-	2.38	1.55	1.97
GS6N4DE-	2.45	2.12	2.29
MEAN	2.11	1.58	1.84

3RD CUTTING OCCASION MEAN DM% 14.2

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80/W/CS/200 BUTT FURLONG (W)
4TH CUTTING OCCASION (6/8/80) DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.00	0.13	0.06
RG6N1DE-	0.40	0.59	0.49
RG6N2DE-	1.33	1.19	1.26
RG6N3DE-	2.33	1.85	2.09
RG6N4DE-	2.92	2.73	2.83
RG6N5DE-	2.60	3.57	3.09
RG6N6DE-	3.06	2.99	3.03
GB6NO---	2.11	2.08	2.09
GB6N1DE-	2.46	1.74	2.10
GB6N2DE-	2.31	1.83	2.07
GB6N3DE-	2.59	1.92	2.26
GB6N4DE-	2.31	1.89	2.10
GS6NO---	1.40	2.00	1.70
GS6N1DE-	1.21	2.19	1.70
GS6N2DE-	1.87	2.61	2.24
GS6N3DE-	2.44	2.64	2.54
GS6N4DE-	2.63	3.00	2.82
GB3NO---	3.43	3.02	3.23
GB3N1DE-	3.68	2.71	3.20
GB3N2DE-	3.24	2.89	3.06
GB3N3DE-	3.71	2.76	3.24
GB3N4DE-	3.38	2.44	2.91
GB3NO--C	4.08	4.38	4.23
GB3N1DEC	4.44	4.16	4.30
GB3N2DEC	4.04	3.51	3.78
GB3N3DEC	5.91	3.93	4.92
GB3N4DEC	4.32	4.86	4.59
GB3N1SP-	3.07	2.56	2.81
GB3N1SS-	3.91	2.14	3.03
GB3N2SS-	4.27	2.44	3.36
RG3N2DE-	4.21	3.25	3.73
RG3N2DEC	4.97	5.13	5.05
CL3NO---	2.63	2.51	2.57
CL3N2DE-	2.50	2.63	2.57
CL3NO--C	3.78	3.12	3.45
CL3N2DEC	3.60	3.10	3.35
LU3NO---	5.77	4.52	5.15
LU3NO--C	5.68	5.41	5.54
MEAN	3.33	2.93	3.13

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.247	0.349

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.349	11.2

4TH CUTTING OCCASION MEAN DM% 15.0

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80/W/CS/200 BUTT FURLONG (W)

5TH CUTTING OCCASION (3/9/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.00	0.07	0.04
RG6N1DE-	0.46	0.60	0.53
RG6N2DE-	0.79	1.08	0.93
RG6N3DE-	1.39	1.86	1.63
RG6N4DE-	1.65	1.80	1.72
RG6N5DE-	1.54	1.76	1.65
RG6N6DE-	2.13	1.70	1.92
GB6N0---	1.66	1.61	1.63
GB6N1DE-	1.53	1.24	1.38
GB6N2DE-	1.58	1.32	1.45
GB6N3DE-	1.64	1.44	1.54
GB6N4DE-	1.60	1.35	1.47
GS6N0---	1.24	1.51	1.38
GS6N1DE-	1.14	1.39	1.27
GS6N2DE-	1.16	1.42	1.29
GS6N3DE-	1.53	1.38	1.45
GS6N4DE-	1.81	1.64	1.72
MEAN	1.34	1.36	1.35

5TH CUTTING OCCASION MEAN DM% 17.0

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80/W/CS/200 BUTT FURLONG (W)
6TH CUTTING OCCASION (1/10/80) DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6N0---	0.06	0.06	0.06
RG6N1DE-	0.39	0.40	0.39
RG6N2DE-	0.70	0.83	0.76
RG6N3DE-	1.01	1.33	1.17
RG6N4DE-	0.98	1.51	1.24
RG6N5DE-	0.91	1.69	1.30
RG6N6DE-	1.33	1.55	1.44
GB6N0---	0.65	0.80	0.72
GB6N1DE-	0.75	0.48	0.61
GB6N2DE-	0.69	0.75	0.72
GB6N3DE-	0.73	0.74	0.73
GB6N4DE-	0.85	0.85	0.85
GS6N0---	0.85	0.85	0.85
GS6N1DE-	0.76	0.88	0.82
GS6N2DE-	0.73	1.09	0.91
GS6N3DE-	0.87	1.24	1.06
GS6N4DE-	1.07	1.57	1.32
GB3N0---	1.37	1.28	1.32
GB3N1DE-	1.35	1.38	1.37
GB3N2DE-	1.54	1.69	1.62
GB3N3DE-	1.59	1.19	1.39
GB3N4DE-	1.24	1.49	1.36
GB3N0--C	2.22	2.35	2.29
GB3N1DEC	1.84	2.46	2.15
GB3N2DEC	2.48	1.96	2.22
GB3N3DEC	2.47	2.89	2.68
GB3N4DEC	2.81	2.89	2.85
GB3N1SP-	1.18	1.19	1.18
GB3N1SS-	1.45	1.06	1.25
GB3N2SS-	1.42	1.32	1.37
RG3N2DE-	2.30	2.58	2.44
RG3N2DEC	2.41	3.37	2.89
CL3N0---	1.36	1.41	1.38
CL3N2DE-	1.14	1.23	1.19
CL3N0--C	2.08	1.96	2.02
CL3N2DEC	2.18	1.95	2.06
LU3N0---	3.52	2.72	3.12
LU3N0--C	3.27	3.00	3.14
MEAN	1.56	1.62	1.59

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.188	0.266

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.266	16.7

6TH CUTTING OCCASION MEAN DM% 16.7

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80/W/CS/200 BUTT FURLONG (W)
TOTAL OF 6 CUTTING OCCASIONS DRY MATTER TONNES/HECTARE
***** TABLES OF MEANS *****

IRRIGATN TREATMNT	NONE	FULL	MEAN
RG6NO---	0.58	1.31	0.94
RG6N1DE-	2.67	4.06	3.36
RG6N2DE-	5.75	7.12	6.44
RG6N3DE-	9.57	11.27	10.42
RG6N4DE-	12.49	13.86	13.18
RG6N5DE-	12.07	16.27	14.17
RG6N6DE-	15.05	15.46	15.25
GB6NO---	9.23	11.97	10.60
GB6N1DE-	10.85	10.66	10.75
GB6N2DE-	10.40	11.17	10.78
GB6N3DE-	11.29	11.84	11.57
GB6N4DE-	11.91	11.45	11.68
GS6NO---	5.84	11.61	8.72
GS6N1DE-	6.37	11.67	9.02
GS6N2DE-	8.37	12.10	10.23
GS6N3DE-	10.45	12.67	11.56
GS6N4DE-	12.18	14.78	13.48
GB3NO---	7.44	8.60	8.02
GB3N1DE-	8.05	8.22	8.13
GB3N2DE-	8.23	9.54	8.89
GB3N3DE-	8.15	8.75	8.45
GB3N4DE-	8.06	8.46	8.26
GB3NO--C	10.15	13.15	11.65
GB3N1DEC	10.85	12.64	11.75
GB3N2DEC	11.59	13.75	12.67
GB3N3DEC	13.09	13.44	13.26
GB3N4DEC	12.74	15.09	13.91
GB3N1SP-	7.36	8.33	7.85
GB3N1SS-	8.77	7.41	8.09
GB3N2SS-	9.22	8.00	8.61
RG3N2DE-	8.32	9.82	9.07
RG3N2DEC	10.32	13.82	12.07
CL3NO---	5.05	7.83	6.44
CL3N2DE-	5.12	7.34	6.23
CL3NO--C	8.20	10.46	9.33
CL3N2DEC	8.77	10.29	9.53
LU3NO---	15.46	14.44	14.95
LU3NO--C	15.41	15.70	15.55
MEAN	9.30	10.73	10.01

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT*	IRRIGATN* TREATMNT
SED	0.545	0.771

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	24	0.771	7.7

TOTAL OF 6 CUTTING OCCASIONS MEAN DM% 16.2 SUB PLOT AREA HARVESTED 0.00038

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80/R/CS/202

EFFECTS OF PHIALOPHORA

Object: To study the effects of ryegrass, oats and wheat, and of soil inoculation on populations of Phialophora radicicola graminicola (Prg) and on take-all (Gauemannomyces graminis) and yield of following w. wheat crops - Whittlocks.

Sponsors: E. Lester, D.B. Slope, R.J. Gutteridge.

The fourth year, w. wheat.

For previous years see 77-79/R/CS/202.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 2.67 x 6.10.

Treatments:

CRP INOC	Crops in 1977 (all w. wheat 1978 to 1980) and inoculation in 1977 and 1978:
GRASS	Ryegrass
GRASS(I)	Ryegrass + Prg inoculum 1977
OATS	S. oats
OATS(I)	S. oats + Prg inoculum 1977
OATS I	S. oats + Prg inoculum to 1978 wheat
OATS DI	S. oats + dummy inoculum (sand) to 1978 wheat
WHEAT	S. wheat
WHEAT(I)	S. wheat + Prg inoculum 1977

NOTE: Phialophora inoculum was a culture macerated in coarse sand. Coarse sand alone was applied as dummy inoculum.

Basal applications: Manures: (0:20:20) at 260 kg, combine drilled. 'Nitro-chalk' at 480 kg. Weedkillers: Methabenzthiazuron at 3.1 kg in 220 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l. Insecticide: Demeton-s-methyl at 0.24 kg in 250 l.

Seed: Flanders, sown at 200 kg.

Cultivations, etc.:- Ploughed: 19 Sept, 1979. Rotary harrowed: 6 Oct. Seed sown, methabenzthiazuron applied: 8 Oct. N applied: 11 Apr, 1980. 'Brittox' applied: 24 Apr. Insecticide applied: 24 June. Combine harvested: 21 Aug.

NOTE: Estimates of take-all and Phialophora were made on the crop in April and early July. Bio-assays of soils for take-all and Phialophora were made after harvest, before ploughing.

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80/R/CS/202

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

CRP INOC	
GRASS	6.77
GRASS(I)	6.71
OATS	5.83
OATS(I)	6.36
OATS I	6.60
OATS DI	5.92
WHEAT	6.54
WHEAT(I)	6.26
MEAN	6.37

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	CRP INOC
SED	0.544

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.666	10.4

GRAIN MEAN DM% 82.6

PLOT AREA HARVESTED 0.00116

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80/R/CS/203

SPECIES MIXTURES AND PHIALOPHORA

Object: To study the effects of lucerne, grass and clover, singly and in mixtures, and of soil inoculation on populations of Phialophora radicicola graminicola (Prg) and on take-all (Gaeumannomyces graminis) and yield of following w. wheat crops - Stubbings.

Sponsors: E. Lester, D.B. Slope, R.J. Gutteridge.

The fourth year, w. wheat.

Design: 4 randomised blocks of 9 plots, split into 4.

Whole plot dimensions: 4.27 x 27.1.

Treatments: All combinations of:-

1. Whole plots

CRP	INOC	Crops in 1977 and 1978 (all w. wheat 1979 & 1980) and inoculation:-	
		1977	1978
C	C	White clover	White clover
G	G	Ryegrass	Ryegrass
GC	GC	Ryegrass/white clover mixture	Ryegrass/white clover
LU	LU	Lucerne	Lucerne
LU	LU I	Lucerne	Lucerne + Prg inoculum to 1979 wheat
GLU	GLU	Ryegrass/lucerne in alternate rows	Ryegrass/lucerne
W	G	Spring wheat	Ryegrass, sown into spring wheat stubble
WG	G	Spring wheat undersown with ryegrass	Ryegrass
WGI	G	Spring wheat, inoculated Prg, undersown with ryegrass	Ryegrass

2. Sub plots

N — Nitrogen fertiliser (kg N) in 1979 & 1980, cumulative:

0
50
100
150

NOTE: The inoculum used for the I treatments was an agar culture of Prg mixed with sand. It was broadcast and power harrowed into the soil before sowing.

Basal applications: Manures: (0:20:20) at 250 kg, combine drilled.
Weedkiller: Methabenzthiazuron at 3.1 kg in 220 l.

Seed: Flanders, sown at 200 kg.

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80/R/CS/203

Cultivations, etc.:- Ploughed: 12 Sept, 1979. Rotary harrowed: 4 Oct. Seed sown: 5 Oct. Methabenzthiazuron applied: 8 Oct. N applied: 14 Apr, 1980. Combine harvested: 20 Aug.

NOTE: Estimates of take-all and Phialophora were made in April and early July. Bio-assays of soils for take-all and Phialophora were made after harvest, before ploughing.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	50	100	150	MEAN
CRP INOC					
C C	3.57	5.83	7.75	7.70	6.21
G G	4.80	5.94	7.33	7.79	6.47
GC GC	3.93	6.40	7.03	7.97	6.33
LU LU	3.86	6.43	7.23	7.88	6.35
LU LU I	3.92	5.53	7.29	7.88	6.15
GLU GLU	3.80	5.49	7.30	7.93	6.13
W G	3.75	5.63	6.84	7.54	5.94
WG G	4.13	6.57	6.86	7.67	6.31
WGI G	4.02	6.46	7.39	7.75	6.41
MEAN	3.98	6.03	7.22	7.79	6.26

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	CRP INOC	N	CRP INOC N
SED	0.180	0.141	0.408
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
CRP INOC			0.423

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	24	0.254	4.1
BLOCK.WP.SP	81	0.599	9.6

GRAIN MEAN DM% 83.3

SUB PLOT AREA HARVESTED 0.00128

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80/R/CS/211

FACTORS AFFECTING EYESPOT

Object: To study the effects of a range of treatments on the incidence of eyespot (Pseudocercosporella herpotrichoides) and on the yield of w. wheat - Meadow.

Sponsors: R.D. Prew, A. Bainbridge.

The third year, w. wheat.

For previous years see 78-79/R/CS/211.

Design: 2 randomised blocks of 2 whole plots split into 6 sub plots split into 3 sub sub plots.

Whole plot dimensions: 94.0 x 9.14.

Treatments: All combinations of:-

Whole plots

1. STRAW		Treatment of straw in autumn:
	BURNT	Burnt on site after spreading
	CARTED	Baled and carted off

Sub plots

2. DRILLING		Cultivations and drilling in autumn:
	CNVNTIAL	Cultivated and conventionally drilled
	DIRECT	Uncultivated, direct drilled
3. SOW DATE		Dates of sowing:
	17 SEPT	17 September, 1979
	15 OCT	15 October
	9 NOV	9 November

Sub sub plots

4. SEEDRATE	Seed rates (kg):
	100
	150
	200

NOTE: All treatments were cumulative.

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 500 kg. Weedkillers: Paraquat at 0.84 kg ion in 220 l (to DIRECT only). Metoxuron at 4.4 kg in 220 l. Mecoprop at 2.5 l in 250 l. Insecticide: Demeton-s-methyl at 0.24 kg in 250 l.

Seed: Armada.

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80/R/CS/211

Cultivations, etc.:- Straw treatments applied: 7 Sept, 1979. CNVNTIAL treatments ploughed, paraquat applied to DIRECT treatments only: 13 Sept. CNVNTIAL 17 SEPT treatments harrowed. DIRECT 17 SEPT disc harrowed three times. Seed sown on all 17 SEPT plots: 17 Sept. CNVNTIAL 15 OCT treatments rotary harrowed, DIRECT 15 OCT treatments disc harrowed twice, seed sown on all 15 OCT plots: 15 Oct. CNVNTIAL 9 NOV treatments rotary harrowed. DIRECT 9 NOV treatments disc harrowed twice, seed sown on all 9 NOV plots: 9 Nov. Metoxuron applied: 29 Feb, 1980. N applied: 10 Apr. Mecoprop applied: 24 Apr. Insecticide applied: 25 June. Combine harvested: 22 Aug.

NOTE: Plants were assessed for infection with eyespot and the incidence of eyespot spores was measured throughout the year. Take-all (Gaeumannomyces graminis) was assessed at harvest.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

DRILLING	CNVNTIAL	DIRECT	MEAN
STRAW			
BURNT	5.00	4.98	4.99
CARTED	5.06	5.76	5.41
MEAN	5.03	5.37	5.20

SOW DATE	17 SEPT	15 OCT	9 NOV	MEAN
STRAW				
BURNT	4.70	5.66	4.62	4.99
CARTED	4.55	5.84	5.84	5.41
MEAN	4.63	5.75	5.23	5.20

SOW DATE	17 SEPT	15 OCT	9 NOV	MEAN
DRILLING				
CNVNTIAL	4.20	5.65	5.25	5.03
DIRECT	5.05	5.85	5.21	5.37
MEAN	4.63	5.75	5.23	5.20

SEEDRATE	100	150	200	MEAN
STRAW				
BURNT	4.82	5.00	5.16	4.99
CARTED	5.25	5.39	5.59	5.41
MEAN	5.03	5.19	5.38	5.20

SEEDRATE	100	150	200	MEAN
DRILLING				
CNVNTIAL	4.84	5.09	5.17	5.03
DIRECT	5.23	5.30	5.58	5.37
MEAN	5.03	5.19	5.38	5.20

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80/R/CS/211

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SEEDRATE	100	150	200	MEAN
SOW DATE				
17 SEPT	4.67	4.46	4.74	4.63
15 OCT	5.57	5.88	5.80	5.75
9 NOV	4.86	5.24	5.60	5.23
MEAN	5.03	5.19	5.38	5.20

	SOW DATE	17 SEPT	15 OCT	9 NOV
STRAW	DRILLING			
BURNT	CNVNTIAL	4.98	5.62	4.41
	DIRECT	4.42	5.69	4.84
CARTED	CNVNTIAL	3.42	5.68	6.09
	DIRECT	5.69	6.01	5.59

	SEEDRATE	100	150	200
STRAW	DRILLING			
BURNT	CNVNTIAL	4.68	5.21	5.12
	DIRECT	4.96	4.80	5.20
CARTED	CNVNTIAL	4.99	4.97	5.22
	DIRECT	5.51	5.80	5.97

	SEEDRATE	100	150	200
STRAW	SOW DATE			
BURNT	17 SEPT	4.71	4.57	4.81
	15 OCT	5.48	5.79	5.70
	9 NOV	4.26	4.65	4.96
CARTED	17 SEPT	4.64	4.36	4.66
	15 OCT	5.67	5.97	5.89
	9 NOV	5.45	5.83	6.23

	SEEDRATE	100	150	200
DRILLING	SOW DATE			
CNVNTIAL	17 SEPT	4.43	4.15	4.01
	15 OCT	5.26	5.83	5.85
	9 NOV	4.82	5.29	5.65
DIRECT	17 SEPT	4.92	4.78	5.46
	15 OCT	5.88	5.93	5.74
	9 NOV	4.90	5.20	5.54

		SEEDRATE	100	150	200
STRAW	DRILLING	SOW DATE			
BURNT	CNVNTIAL	17 SEPT	5.07	4.86	5.00
		15 OCT	5.41	5.85	5.60
		9 NOV	3.55	4.92	4.76
	DIRECT	17 SEPT	4.35	4.28	4.63
		15 OCT	5.55	5.73	5.80
		9 NOV	4.96	4.39	5.16
CARTED	CNVNTIAL	17 SEPT	3.78	3.44	3.02
		15 OCT	5.12	5.81	6.10
		9 NOV	6.08	5.65	6.54
	DIRECT	17 SEPT	5.49	5.28	6.30
		15 OCT	6.21	6.13	5.68
		9 NOV	4.83	6.00	5.92

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80/R/CS/211

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	DRILLING	SOW DATE	SEEDRATE
SED	0.232	0.285	0.175

TABLE	STRAW* DRILLING	STRAW* SOW DATE	DRILLING SOW DATE	STRAW* SEEDRATE
SED	0.329	0.403	0.403	0.247

TABLE	DRILLING SEEDRATE	SOW DATE SEEDRATE	STRAW* DRILLING SOW DATE	STRAW* DRILLING SEEDRATE
SED	0.308	0.377	0.569	0.435
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
DRILLING	0.247			
SOW DATE		0.303		
STRAW.DRILLING				0.350

TABLE	STRAW* SOW DATE SEEDRATE	DRILLING SOW DATE SEEDRATE	STRAW* DRILLING SOW DATE SEEDRATE
SED	0.533	0.533	0.754
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
STRAW.SOW DATE	0.429		
DRILLING.SOW DATE		0.429	
STRAW.DRILLING.SOW DATE			0.606

* WITHIN THE SAME LEVEL OF STRAW ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	10	0.569	10.9
BLOCK.WP.SP.SSP	24	0.606	11.7

GRAIN MEAN DM% 84.7

SUB PLOT AREA HARVESTED DRILLING DIRECT 0.00252

SUB PLOT AREA HARVESTED DRILLING CNVNTIAL 0.00257

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80/R/CS/212

SEASONAL EFFECTS OF TAKE-ALL

Object: To study the incidence of take-all (Gaeumannomyces graminis) in continuous w. wheat and in first and second w. wheats after a break - Great Harpenden I.

Sponsor: D. Hornby.

The third year, s. beans, w. wheat.

For previous years see 78-79/R/CS/212.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 5.33 x 31.4.

Treatments:

PREVCROP — Previous crops before w. wheat 1980:

	1978	1979
W W	W	W
W BE	W	BE
BE W	BE	W

BE = s. beans, W = w. wheat

NOTE: An additional crop sequence was in s. beans 1980, yields not taken.

Basal applications: Manures: Chalk at 7.5 t. Weedkiller: Glyphosate at 1.5 kg in 220 l.

Standard applications:
- Wheat: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 350 kg. Weedkillers: Methabenzthiazuron at 3.1 kg in 220 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 880 l. Insecticide: Demeton-s-methyl at 0.24 l in 250 l.
- Beans: Weedkillers: Trietazine with simazine (as 'Remtal SC' at 2.5 l) in 250 l.

Seed: Wheat: Flanders, sown at 190 kg.
Beans: Minden, sown at 180 kg.

Cultivations, etc.:-
- All plots: Glyphosate applied: 24 Sept, 1979. Chalk applied: 9 Oct. Ploughed: 11 Oct.
- Wheat: Rotary harrowed, seed sown: 17 Oct. Methabenzthiazuron applied: 20 Oct. N applied: 11 Apr, 1980. 'Brittox' applied: 2 Apr. Insecticide applied: 24 June. Combine harvested: 22 Aug.
- Beans: Rotary harrowed, seed sown: 5 Mar, 1979. Weedkillers applied: 21 Mar. Combine harvested: 17 Sept.

NOTE: Take-all in soil and plants was assessed throughout the season.

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80/R/CS/212

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PREVCROP	W W	W BE	BE W	MEAN
	5.28	6.23	6.10	5.87

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PREVCROP
SED	0.183

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.224	3.8

GRAIN MEAN DM% 83.9

PLOT AREA HARVESTED 0.00434

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80/R/CS/216 and 80/W/CS/216

EFFECTS OF SUBSOILING & DEEP PK

Object: To study the effects of subsoiling and of incorporating a large dressing of PK in the subsoil on yields and nutrient uptakes of a sequence of crops - Rothamsted (R) Delharding and Woburn (W) Road Piece.

Sponsors: J. McEwen, A.E. Johnston (R), M.K.V. Carr, R.J. Godwin (National College of Agricultural Engineering), P.T. Gooderham, I.B. Warboys, J.M. Wilkes (Wye College).

The third year, s. barley.

For previous years see 78-79/R&W/CS/216.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 4.27 x 13.7.

Treatments:

TREATMNT	Machines and incorporation of extra P and K into the subsoil:
OOO OO	Not subsoiled, no P or K
FOO FO	Farm standard, unwinged, subsoiler, no P or K, autumn 1977 & autumn 1979
NOO NO	N.C.A.E. winged subsoiler, no P or K, autumn 1977 & autumn 1979
NPK NO	N.C.A.E. winged subsoiler, P and K applied autumn 1977, subsoiled only autumn 1979
WOO OO	Wye double digger, no P or K, autumn 1977 only
WPK OO	Wye double digger, P and K applied, autumn 1977 only

NOTES: (1) The rates of P and K were 1930 kg P_2O_5, as triple superphosphate and 460 kg K_2O as muriate of potash.

(2) In autumn 1977 the Farm standard, unwinged, subsoiler was set to work at a depth of 38 cm at intervals of 50 cm Delharding (R) and at a depth of 50 cm at intervals of 70 cm Road Piece (W). In autumn 1979 it was set to work at a depth of 56 cm at intervals of 76 cm Delharding (R) and 142 cm Road Piece (W).

(3) In autumn 1977 the N.C.A.E. winged subsoiler had a single tine set to work at a depth of 40 cm at intervals of 60 cm on plots not given P and K and at alternate depths of 30 cm and 40 cm spaced 30 cm apart on plots given P and K; fertiliser was applied behind the subsoiling points. In autumn 1979 the winged subsoiler had three tines, the centre tine preceding the others, all set to work at a depth of 40 cm spaced 40 cm apart.

(4) The Wye double digger turned a furrow with a conventional plough to a depth of 23 cm and at the same time rotary cultivated the bottom of the furrow to a further depth of 15 cm. When applying P & K this was distributed ahead of the rotary cultivator.

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80/R/CS/216 and 80/W/CS/216

Basal applications:

Delharding (R): Manures: (20:10:10) at 450 kg, combine drilled. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l) in 250 l with the tridemorph. Fungicides: Tridemorph at 0.53 kg. Triadimefon at 0.12 kg in 250 l.

Road Piece (W): Manures: Magnesian limestone at 7.5 t. (20:10:10) at 450 kg, combine drilled. Weedkillers: Glyphosate at 1.7 kg in 250 l. Dicamba with mecoprop and MCPA ('Banlene plus' at 4.9 l) in 280 l. Fungicides: Tridemorph at 0.53 kg in 280 l. Ethirimol (as 'Milgo E' at 1.3 l) in 280 l.

Cultivations, etc.:-

Delharding (R): Winged subsoiler treatment applied: 12 Oct, 1979. Farm subsoiler treatment applied: 17 Oct. Chisel ploughed (except winged subsoiler plots): 29 Oct. Spring-tine cultivated: 3 Mar, 1980. Seed sown: 5 Mar. Weedkillers with tridemorph applied: 7 May. Triadimefon applied: 3 June. Combine harvested: 18 Aug.

Road Piece (W): Glyphosate applied: 28 Sept, 1979. Winged subsoiler treatment applied: 12 Oct. Farm subsoiler treatment applied: 20 Oct. Deep-tine cultivated 23 cm deep (except winged subsoiler plots): 24 Oct. Heavy spring-tine cultivated: 29 Feb, 1980. Rotary cultivated, seed sown: 4 Mar. 'Banlene plus' applied: 7 May. Tridemorph applied: 13 May. Ethirimol applied: 5 June. Combine harvested: 19 Aug.

NOTES: (1) Bulk densities of soil were measured on Road Piece (W).
(2) Water and nutrient contents of green crop were measured during the season.
(3) Nutrient contents of grain were measured.
(4) On Delharding (R) some plots were damaged by sparrows near maturity. A hand harvest yield was obtained from all plots from undamaged areas. Combine harvester yields were also obtained except for two of the replicates of WPK 00 on which there was insufficient undamaged area remaining. Combine harvester yields are presented with the two missing plots estimated from the hand harvested yields.

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80/R/CS/216 DELHARDING (R)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	000 00	F00 F0	N00 N0	NPK N0	W00 00	WPK 00	MEAN
	7.23	7.56	6.33	7.25	7.68	7.57	7.27

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT
SED	0.543

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.665	9.1

GRAIN MEAN DM% 80.6

PLOT AREA HARVESTED 0.00217

80/W/CS/216 ROAD PIECE (W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	000 00	F00 F0	N00 N0	NPK N0	W00 00	WPK 00	MEAN
	4.88	5.44	5.32	5.46	5.34	5.26	5.28

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT
SED	0.287

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.352	6.7

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00260

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80/R/CS/230

STUBBLE TREATMENT AND LIGHT LEAF SPOT

Object: To study the residual effects of treatments applied to w. oilseed rape in 1978 on the incidence of mildew and yield of s. barley in 1980 - Gt. Field I.

Sponsor: C.J. Rawlinson.

Design: 4 randomised blocks of 6 plots.

The third year, s. barley.

For first year see 78/R/RA/1.

Whole plot dimensions: 8.53 x 4.27.

Treatments:

FUNGICIDE	Fungicides, rates and times of application		
	To rape crop		To rape stubble
	5 Oct, 1977	18 Jan, 1978	22 Aug, 1978
- -	None	None	None (duplicated)
B1 B2	Benomyl 1.12 kg	None	Benomyl 2.0 kg
B2 B2	Benomyl 1.12 kg	Benomyl 1.12 kg	Benomyl 2.0 kg
T1 T8	Triadimefon 0.25 kg	None	Triadimefon 2.0 kg
T2 T8	Triadimefon 0.25 kg	Triadimefon 0.25 kg	Triadimefon 2.0 kg

NOTES: (1) W. oilseed rape was self-sown in autumn 1978, with minimum cultivations. The crop was severely damaged by birds and yields were not taken.

(2) W. oilseed rape was again self-sown in autumn 1979, with minimum cultivations. Additional treatments testing forms of nitrogen to stubble in autumn 1979 and spring 1980 were applied. The crop failed and was replaced by s. barley. Yields of the s. barley showed no effects from treatments applied to the 1980 crop of w. oilseed rape and these have been ignored in the analysis presented.

Basal applications: Manures: (13:13:20) at 380 kg. N at 160 kg, form depended on treatments. Weedkillers: Dalapon at 0.95 kg in 340 l. Propyzamide at 0.70 kg in 340 l. Dalapon at 2.8 kg with propyzamide at 0.56 kg in 340 l. 3, 6 - Dichloropicolinic acid with benazolin (as 'Benazalox' at 2.2 kg, in 340 l. Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 5.0 l) in 250 l.

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- NPK applied: 10 Sept, 1979. Dalapon applied: 13 Sept. Propyzamide applied: 24 Sept. First half N applied: 4 Oct. Dalapon applied with propyzamide: 5 Oct. 'Benazalox' applied: 29 Jan, 1980. Second half N applied: 20 Feb. Rape topped, chisel ploughed, rotary harrowed and barley sown: 18 Apr. 'Banlene Plus' applied: 25 May. Combine harvested: 2 Sept.

NOTE: Mildew was assessed in early and late June, and early and late July. Components of yield were measured at harvest.

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80/R/CS/230

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	- -	B1 B2	B2 B2	T1 T8	T2 T8	MEAN
	2.49	2.48	2.71	3.47	3.62	2.88

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	FUNGCIDE	
SED	0.224	MIN REP
	0.194	MAX-MIN

FUNGCIDE
MAX-MIN - - V ANY OF THE REMAINDER
MIN REP ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.316	11.0

GRAIN MEAN DM% 79.6

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	- -	B1 B2	B2 B2	T1 T8	T2 T8	MEAN
	2.67	2.59	2.65	3.76	3.64	2.99

STRAW MEAN DM% 63.4

PLOT AREA HARVESTED 0.00264

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80/W/CS/239

LATE N

Object: To study the residual effects on w. wheat of a range of fertilisers applied to potatoes in 1979 - Woburn, Horsepool.

Sponsors: F.V. Widdowson, A. Penny, J. Ashworth, T.M. Addiscott.

The second year, w. wheat.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

1. N FORM(79) Forms of nitrogen fertiliser in 1979:

AQ U	Aqueous urea, injected before planting
AQ U+CS2	Aqueous urea + carbon disulphide at 10.0 kg, injected before planting
AQ U+NIT	Aqueous urea + nitrapyrin at 1.0 kg, injected before planting
NC E	'Nitro-Chalk', all to the seedbed
NC E+L	'Nitro-Chalk', half to the seedbed, half in June
IBDU	Isobutylidene diurea, all to the seedbed

2. N RATE(1) Rates of nitrogen fertiliser in 1979 (kg N):

200
300

plus four extra treatments all given 'Nitro-Chalk' in 1979:

EXTRA

NC E100	At 100 kg N, all to the seedbed
NC E400	At 400 kg N, all to the seedbed
NC EL100	At 100 kg N, half to the seedbed, half in June
NC EL400	At 400 kg N, half to the seedbed, half in June

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 380 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in 250 l). Growth regulator: Chlormequat at 1.4 l in 280 l.

Seed: Flanders, sown at 190 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 17 Oct, 1979. Spring-tine cultivated with crumbler attached, seed sown: 18 Oct. Weedkillers applied: 5 Apr, 1980. N applied: 6 Apr. Growth regulator applied: 24 Apr. Combine harvested: 27 Aug.

NOTE: N content of grain was measured.

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80/W/CS/239

GRAIN DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N RATE(1) / N FORM(79)	200	300	MEAN
AQ U	7.57	7.19	7.38
AQ U+CS2	7.37	7.28	7.33
AQ U+NIT	7.53	7.35	7.44
NC E	7.41	6.92	7.17
NC E+L	7.29	7.56	7.42
IBDU	6.57	7.66	7.11
MEAN	7.29	7.33	7.31

EXTRA	NC E100	NC E400	NC EL100	NC EL400	MEAN
	7.28	7.52	6.78	7.46	7.26

GRAND MEAN 7.30

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	N FORM(79)	N RATE(1)	EXTRA	N FORM(79) N RATE(1) & EXTRA
SED	0.233	0.134	0.329	0.329

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	30	0.403	5.5

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00279

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80/R/CS/240

EFFECTS OF MYCORRHIZA ON RESPONSE TO P

Object: To study the effects of inoculating mycorrhiza on the responses of crops to a range of rates of phosphate fertiliser - Delharding.

Sponsors: D.P. Stribley, P.B. Tinker.

The second year, potatoes.

For previous year see 79/R/CS/240.

Design: Single replicate of 24 plots.

Whole plot dimensions: 2.84 x 3.35.

Treatments: All combinations of:-

1. INOCULUM — Mycorrhizal inocula:

NONE	None in 1979 & 1980
G MOSSE	Glomus mosseae in 1979 & 1980
G CALED	Glomus caledonius in 1980, Gigaspora sp. in 1979

2. P — Rates of phosphate fertiliser (kg P), as superphosphate, in 1979 and in 1980:

0
20
40
60
80
100
120
140

NOTES: (1) Leeks planted after potatoes in 1979 established and grew poorly. No treatment gave a yield greater than 0.1 tonnes and yields are not reported.
(2) Four extra plots, used for tests on close-planted potatoes in 1979, were used in 1980 for tests on maize, yields were not taken.
(3) Inoculum was prepared by growing leeks in pots of soil suitably infected with the mycorrhiza. After 20 weeks growth, soil and roots in the pots were chopped and applied to the potatoes at 0.5 kg per tuber. Uninoculated plots received soil and roots at the same rate from pots growing uninfected leeks.

Standard applications:
Leeks: Manures: N at 180 kg, K_2O at 115 kg as (25:0:16).
Potatoes and Maize: Manures: N at 160 kg, as 'Nitro-Chalk', K_2O at 300 kg, as muriate of potash, Mg at 5 kg, as Epsom salts.
Weedkillers: Linuron at 1.0 kg plus paraquat at 0.28 kg ion in 280 l.
Fungicide: Mancozeb at 1.3 kg in 280 l, applied twice, with the insecticide. Insecticide: Pirimicarb at 0.14 kg. Irrigation: 25 mm of water.

Seed: Potatoes: Pentland Crown.
Maize: Fronica.

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80/R/CS/240

Cultivations, etc.:-
Leeks: Spring-tine cultivated: 20 Aug, 1979. NK applied, power harrowed, planted: 6 Sept. Hand harvested: 28 Feb, 1980.
Potatoes and maize: Chisel ploughed three times: 18 Apr. P, N, K & Mg applied, spike rotary cultivated: 22 Apr. Irrigated: 19 May.
Potatoes: Rotary ridged: 22 Apr. Planted: 28 Apr. Weedkillers applied: 22 May. Fungicide and insecticide applied: 3 July, 7 Aug. Haulm cut by hand: 25 Sept. Potatoes lifted: 26 Sept.
Maize: Planted: 23 June. Harvested by hand: 26 Sept.

NOTE: Plots were sampled at intervals during the season to assess mycorrhizal infection, P content of leaves and soil.

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

P / INOCULUM	0	20	40	60	80	100	120	140	MEAN
NONE	43.4	58.3	48.0	65.6	69.8	69.2	72.8	78.2	63.2
G MOSSE	44.2	41.1	52.6	67.7	60.8	66.5	70.9	78.2	60.3
G CALED	32.7	60.4	48.9	60.4	59.1	75.7	58.9	78.4	59.3
MEAN	40.1	53.3	49.8	64.6	63.3	70.5	67.5	78.3	60.9

PLOT AREA HARVESTED 0.00048

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80/W/CS/245

MINIMUM CULTIVATION AND DEEP PK

Object: In the first year: to study the effects of thorough subsoil disturbance and the incorporation of P & K into the subsoil on s. wheat and s. barley, provision is made for additional treatments in subsequent years - Woburn Warren Field I and II.

Sponsors: A.E. Johnston, J. McEwen, R.D. Prew, N.J. Brown, C.A. Edwards, A.W. Neill, P.H. Nicholls, P.F. North, C.J. Rawlinson, O.J. Stedman, A.H. Weir, A.G. Whitehead.

The first year, s. wheat and s. barley.

Whole plot dimensions: 4.27 x 57.6.

Design: 3 series each of 20 x 4 criss cross

Treatments: All combinations of:-

Series

1. SER CROP	Series, crops and previous cropping:	
	SER1 WS1	Series I, s. wheat, first cereal after a break crop
	SER2 WS3	Series II, s. wheat, third cereal after a break crop
	SER3 BS3	Series III, s. barley, third cereal after a break crop

Column plots

2. PK SUB	Extra PK and subsoil treatments (applied autumn 1979):	
	---	None, mouldboard ploughed (six plots per series)
	--S	None, subsoiled (six plots per series)
	PKS	PK to subsoil (six plots per series)
	PKT	PK to topsoil, mouldboard ploughed (two plots per series)

Row plots

3. N PATH	Nitrogen fertiliser to seedbed, and pathogen control:	
	50 ENHD	50 kg N, enhanced pathogen control
	100 ENHD	100 kg N, enhanced pathogen control
	150 ENHD	150 kg N, enhanced pathogen control
	100 STND	100 kg N, standard pathogen control

NOTES: (1) Rates of P and K were 500 kg P_2O_5, as superphosphate, 250 kg K_2O as muriate of potash.
(2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P & K this was distributed ahead of the rotary cultivator.
(3) The topsoil PK dressing was equally divided before and after ploughing.
(4) Standard pathogen control was none, other than conventional seed dressings, including ethirimol to barley. Enhanced pathogen control was the use of the same seed dressings plus prochloraz (as 'Sportak' at 1.0 l) in 280 l applied 12 June, 1980.

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Basal applications: Manures: Magnesian limestone at 5 t (Series II and III only), (0:20:20) at 300 kg, combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 250 l. Dicamba with mecoprop and MCPA as ('Banlene Plus' at 4.9 l) in 280 l (s. barley only). Mecoprop with bromoxynil and ioxynil as ('Brittox' at 3.5 l) in 280 l (s. wheat only).

Seed: S. wheat : Timmo, sown at 180 kg.
S. barley : Georgie, dressed with ethirimol, sown at 160 kg.

Cultivations, etc.:-
Series I: S. wheat: Heavy spring-tine cultivated: 24 Sept, 1979. Paraquat applied: 24 Oct. First half topsoil P and K applied, ploughing and subsoil treatments applied: 28 Nov-4 Dec. Second half topsoil P and K applied: 7 Dec. Heavy spring-tine cultivated: 21 Feb, 1980. N applied: 5 Mar. Rotary cultivated, spring-tine cultivated with crumbler attached: 7 Apr. Seed sown: 8 Apr. 'Brittox' applied: 11 June. Combine harvested: 18 Sept. Previous crops: S. barley 1978, s. oats 1979.
Series II: S. wheat: Heavy spring-tine cultivated: 24 Sept, 1979. Magnesian limestone applied: 29 Sept. Paraquat applied: 24 Oct. First half topsoil P and K applied, ploughing and subsoil treatments applied: 4-7 Dec. Second half topsoil P and K applied: 6 Dec. Heavy spring-tine cultivated: 21 Feb, 1980. N applied: 5 Mar. Rotary cultivated: 5 Apr. Spring-tine cultivated with crumbler attached: 7 Apr. Seed sown: 8 Apr. 'Brittox' applied: 11 June. Combine harvested: 19 Sept. Previous crops: W. wheat 1978 and 1979.
Series III: S. barley: Heavy spring-tine cultivated: 24 Sept, 1979. Magnesian limestone applied: 29 Sept. Paraquat applied: 24 Oct. First half topsoil P and K applied: 21 Nov. Ploughing and subsoil treatments applied 21-27 Nov. Second half topsoil P and K applied: 7 Dec. Heavy spring-tine cultivated: 21 Feb. N applied, rotary cultivated, seed sown: 5 Mar. 'Banlene Plus' applied: 7 May. Combine harvested: 22 Aug. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Plant establishment counts were made. Observations on diseases were made during the season. Components of yield of s. barley were measured at harvest.

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80/W/CS/245

SERIES I SPRING WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N PATH / PK SUB	50 ENHD	100 ENHD	150 ENHD	100 STND	MEAN
---	3.61	3.55	3.71	3.17	3.51
--S	3.28	3.40	3.58	3.18	3.36
PKS	3.74	3.85	3.90	3.44	3.73
PKT	4.24	4.02	4.29	3.85	4.10
MEAN	3.61	3.64	3.79	3.32	3.59

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB	PK SUB* N PATH	
SED		0.319	MIN REP
	0.227	0.261	MAX-MIN
	0.161	0.184	MAX REP

* WITHIN THE SAME LEVEL OF N PATH ONLY

	PK SUB
MAX-MIN	PKT V ANY OF THE REMAINDER
MIN REP	PKT ONLY
MAX REP	ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP1	16	0.278	7.8
WP1.WP2	48	0.181	5.0

GRAIN MEAN DM% 77.6

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80/W/CS/245

SERIES II SPRING WHEAT

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N PATH PK SUB	50 ENHD	100 ENHD	150 ENHD	100 STND	MEAN
---	3.72	3.98	4.28	3.30	3.82
--S	3.36	3.83	3.95	3.19	3.58
PKS	3.81	4.11	4.11	3.47	3.87
PKT	4.03	4.39	4.58	3.83	4.21
MEAN	3.67	4.01	4.16	3.37	3.80

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB	PK SUB* N PATH	
SED		0.290	MIN REP
	0.191	0.236	MAX-MIN
	0.135	0.767	MAX REP

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP1	16	0.234	6.2
WP1.WP2	48	0.197	5.2

GRAIN MEAN DM% 81.4

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80/W/CS/245

SERIES III SPRING BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N PATH / PK SUB	50 ENHD	100 ENHD	150 ENHD	100 STND	MEAN
---	5.07	5.96	6.72	5.95	5.93
--S	5.10	6.01	6.73	5.54	5.85
PKS	5.57	6.38	7.00	6.07	6.25
PKT	5.70	6.12	6.94	6.01	6.19
MEAN	5.29	6.12	6.83	5.87	6.03

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB	PK SUB* N PATH
SED		0.377
	0.204	0.308
	0.144	0.218

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP1	16	0.250	4.2
WP1.WP2	48	0.326	5.4

GRAIN MEAN DM% 84.1

PLOT AREA HARVESTED 0.00386

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80/R/CS/246

EFFECTS OF SUBSOILING & DEEP PK

Object: To study the effects of thorough subsoil disturbance and the incorporation of P & K into the subsoil on soil and crop parameters and on yield of s. barley - Gt. Field I.

Sponsors: J. McEwen, A.E. Johnston, T.M. Addiscott, P. Barraclough, W. Day, R. Leigh, A.C.D, Newman, P.J. Taylor, P.J. Welbank, D.P. Yeoman.

The first year, s. barley.

Whole plot dimensions: 4.27 x 17.7.

Design: 2 replicates of 28 plots, fully randomised.

Treatments: All combinations of:-

1. PK SUB — Extra PK and subsoil treatment (applied autumn/winter 1979/80)

- - -	None, mouldboard ploughed (duplicated)
- - S	Subsoiled
P - S	P to subsoil
- K S	K to subsoil
P K S	PK to subsoil
P K T	PK to topsoil, mouldboard ploughed

2. N — Nitrogen fertiliser (kg N) to seedbed:

0
40
80
120

NOTES: (1) Rates of P and K were 1000 kg P_2O_5, as superphosphate, 500 kg K_2O, as muriate of potash
(2) Subsoiling was done with the Wye double-digger which turns a furrow with a conventional plough share, to a depth of 23 cm, and at the same time rotary cultivates the bottom of the adjacent furrow to a further depth of 15 cm. When applying P and K this was distributed ahead of the rotary cultivator.
(3) Subsoil treatments were applied from 13 to 17 Dec, 1979.
(4) Mouldboard ploughing was done on 18 Dec.
(5) The topsoil PK dressing was equally divided before and after ploughing, applied on 13 Dec and 14 Jan, 1980.

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. Fungicide: Tridemorph at 0.53 kg applied twice, with weedkillers in 250 l on the first occasion, alone in 220 l on the second. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l).

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- Spring-tine cultivated: 2 Mar, 1980. N applied: 3 Mar. Rotary harrowed, seed sown: 5 Mar. Weedkillers and fungicide applied: 7 May. Fungicide applied: 30 May. Combine harvested: 19 Aug. Previous crops: W. wheat 1978, s. barley 1979.

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NOTE: Measurements were made of total above-ground dry matter, stomatal resistance, leaf water potential, visible light transmission, leaf areas, roots, soil bulk density, air filled pore and interclod spaces in soil, soil water potentials and crop nutrient contents. Many of the measurements were made on selected treatments only.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PK SUB N	- - -	- - S	P - S	- K S	P K S	P K T	MEAN
0	3.16	3.35	3.91	2.77	4.66	3.66	3.52
40	4.17	5.31	4.20	4.58	6.02	5.49	4.85
80	5.88	6.22	6.31	6.55	6.53	5.82	6.17
120	6.39	6.66	6.00	6.48	6.86	6.89	6.52
MEAN	4.90	5.39	5.10	5.10	6.02	5.46	5.27

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PK SUB	N	PK SUB N	
SED	0.441		0.882	MIN REP
	0.382	0.333	0.764	MAX-MIN
			0.624	MAX REP

PK SUB
MAX REP - - -
MAX-MIN - - - V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP	32	0.882	16.7

GRAIN MEAN DM% 81.6

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

PK SUB N	- - -	- - S	P - S	- K S	P K S	P K T	MEAN
0	1.27	1.28	1.20	0.81	1.96	1.28	1.30
40	1.71	2.02	1.81	2.30	3.10	2.22	2.12
80	2.70	2.70	2.49	3.11	3.43	3.08	2.89
120	3.58	2.81	3.05	3.55	4.43	3.48	3.50
MEAN	2.32	2.20	2.14	2.44	3.23	2.51	2.45

STRAW MEAN DM% 74.5

PLOT AREA HARVESTED 0.00217

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80/R/CS/247

ORGANIC MATTER AND EARTHWORM INOCULATION

Object: To study methods of inoculating earthworms into arable soil and the influence of organic materials on subsequent multiplication and spread - Hoosfield.

Sponsor: C.A. Edwards.

The first year, w. wheat.

Design: 3 randomised blocks of 9 plots.

Whole plot dimensions: 7.85 x 7.62.

Treatments: All combinations of:

1. WORMINOC — Earthworms and inoculation method:

NONE	None
	Earthworms (Lumbricus terrestris) applied at 16,700 per hectare: 21 Nov, 1979
EVEN	Evenly spaced throughout
CONC	Concentrated in metre squares, 100 earthworms per square metre

2. ORG MATT — Forms of organic matter:

NONE	None
STR	Straw at 4.7 t
STR+FYM	Straw at 4.7 t plus farmyard manure at 40 t

Basal application: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 560 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l applied twice. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l. Insecticide: Demeton-s-methyl at 0.24 kg in 250 l.

Seed: Flanders, sown at 200 kg.

Cultivations, etc.:- Preceding barley straw burned: 7 Sept, 1979. Paraquat applied: 6 Oct. Disc harrowed twice: 8 Oct. Paraquat applied: 18 Oct. Direct drilled: 19 Oct. FYM applied: 3 Jan, 1980. Straw applied: 15 Jan. N applied: 11 Apr. 'Brittox' applied: 7 May. Insecticide applied: 24 June. Combine harvested: 22 Aug. Previous crops: S. wheat 1978, s. barley 1979.

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80/R/CS/247

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

ORG MATT / WORMINOC	NONE	STR	STR+FYM	MEAN
NONE	7.16	6.74	6.37	6.76
EVEN	7.25	6.47	6.34	6.69
CONC	7.16	6.66	6.42	6.75
MEAN	7.19	6.62	6.38	6.73

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	WORMINOC	ORG MATT	WORMINOC ORG MATT
SED	0.120	0.120	0.208

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	16	0.255	3.8

GRAIN MEAN DM% 83.8

PLOT AREA HARVESTED 0.00240

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80/R/CS/248

DIRECT DRILLING AND SLUG CONTROL

Object: To study the effects of a range of materials and methods of application on the control of slugs and on the yield of direct-drilled w. wheat - Pastures.

Sponsors: G.C. Scott, D.C. Griffiths, C.A. Edwards.

The first year, w. wheat.

Design: 4 randomised blocks of 11 plots.

Whole plot dimensions: 5.33 x 7.62.

Treatments:

TREATMNT	Materials, methods and rates of application:
NONE	None (duplicated)
MB SD	Methiocarb seed dressing (0.2% weight of seed)
SAN 1 SD	'SAN 155' seed dressing (0.1% weight of seed)
SAN 3 SD	'SAN 329' seed dressing (0.1% weight of seed)
MB 1 BCE	Methiocarb at 5.6 kg broadcast 7 Nov before drilling
MB 1 BCL	Methiocarb at 5.6 kg broadcast 19 Nov after drilling
MD CD	Metaldehyde at 7.8 kg combine drilled
MB 1 CD	Methiocarb at 5.6 kg combine drilled
MB 2 CD	Methiocarb at 11.2 kg combine drilled
IOX S	Ioxynil spray (as 'Totril' at 2.8 l) in 450 l before drilling

Basal applications: Manures: 'Nitro-Chalk' at 190 kg and later at 450 kg. Weedkillers: Diquat at 0.59 kg ion in 220 l. Mecoprop at 2.5 l in 220 l. Glyphosate at 2.1 l in 220 l. Isoproturon at 2.9 kg in 250 l. Insecticide: Demeton-s-methyl at 0.24 kg in 250 l.

Seed: Flanders, sown at 180 kg.

Cultivations, etc.:- Diquat applied: 2 Oct, 1979. Mecoprop applied: 9 Oct. Glyphosate applied: 20 Oct. Seed sown: 13 Nov. 'Nitro-Chalk' applied at 190 kg: 18 Feb, 1980. 'Nitro-Chalk' applied at 450 kg: 15 Apr. Isoproturon applied: 24 Apr. Insecticide applied: 24 June. Combine harvested: 21 Aug. Previous crops: Clover 1978 and 1979.

NOTE: Slug counts were made before drilling and during the autumn. Plants were counted and scored for slug damage in Dec, Jan and Apr.

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80/R/CS/248

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	
NONE	6.82
MB SD	6.93
SAN 1 SD	6.64
SAN 3 SD	6.68
MB 1 BCE	7.28
MB 1 BCL	6.97
MD CD	6.16
MB 1 CD	5.85
MB 2 CD	5.17
IOX S	6.57
MEAN	6.54

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT	
SED	0.396	MIN REP
	0.343	MAX-MIN

	TREATMNT
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	31	0.560	8.6

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00213

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80/R/CS/250

CONTROL OF CEPHALOSPORIUM

Object: To study the effects of aldicarb, benomyl and HCH on the incidence of Cephalosporium Stripe (Cephalosporium gramineum) and on the yield of w. wheat - New Zealand.

Sponsors: R.J. Gutteridge, K.E. Fletcher.

The first year, w. wheat.

Design: 3 randomised blocks of 8 plots.

Whole plot dimensions: 2.67 x 6.10.

Treatments:

CHEMICAL	Chemicals and methods of application:
NONE	None (5 plots per block)
ALDICARB	Aldicarb at 10 kg worked in to seedbed
BENOMYL	Benomyl at 20 kg worked in to seedbed
HCH	HCH seed dressing at 0.4 g per kg seed

NOTE: (1) Soil treatments were applied on 8 Oct, 1979.
(2) Benomyl was applied as a drench in 11,200 l of water.

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 340 kg. Weedkiller: Mecoprop at 2.5 l in 220 l. Growth regulator: Chlormequat at 1.4 l in 250 l.

Seed: Bounty, sown at 180 kg.

Cultivations, etc.:- Chisel ploughed: 29 June, 1979, 3 July, 4 July, 17 July. Rotary cultivated: 6 July, 20 Aug. Spring-tine cultivated: 17 July, 27 Sept. Rotary harrowed, seed sown: 8 Oct. Weedkiller applied: 1 Mar, 1980. N applied: 8 Apr. Growth regulator applied: 6 May. Combine harvested: 23 Aug. Previous crops: Grass 1978 and 1979.

NOTES: Wireworm populations were assessed in August 1979, plant emergence in November, plant and shoot damage by stem borers in February, wireworms in May and incidence of Cephalosporium, take-all, and Phialophora in June.

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80/R/CS/250

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

CHEMICAL	NONE	ALDICARB	BENOMYL	HCH	MEAN
	9.30	9.30	9.41	9.14	9.29

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	CHEMICAL	
SED	0.172	MIN REP
	0.134	MAX-MIN

	CHEMICAL
MAX-MIN	NONE V ANY OF THE REMAINDER
MIN REP	ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.211	2.3

GRAIN MEAN DM% 85.3

PLOT AREA HARVESTED 0.00161

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80/W/CS/253

LATE N

Object: To study the effects of a range of fertilisers that release nitrogen later in the growing season than traditional forms on the growth and yield of potatoes - Woburn Lansome III.

Sponsors: F.V. Widdowson, A. Penny, T.M. Addiscott.

The first year, potatoes.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 4.27 x 13.1.

Treatments: All combinations of:-

1. N FORM — Forms of nitrogen fertiliser:

AQ U	Aqueous urea, injected before planting
AQ U+CS2	Aqueous urea + carbon disulphide at 10 kg, injected before planting
AQ U+NIT	Aqueous urea + nitrapyrin at 1 kg, injected before planting
NC E	'Nitro-Chalk', all to the seedbed
NC E+L	'Nitro-Chalk', half to the seedbed, half in June
IBDU	Isobutylidene diurea, all to the seedbed

2. N RATE — Rates of nitrogen fertiliser (kg N):

200
300

plus four extra treatments all given 'Nitro-Chalk':

EXTRA

NC E100	At 100 kg N, all to the seedbed
NC E400	At 400 kg N, all to the seedbed
NC EL100	At 100 kg N, half to the seedbed, half in June
NC EL400	At 400 kg N, half to the seedbed, half in June

NOTE: Aqueous fertilisers were injected on 17 Apr, 1980. IBDU and seedbed 'Nitro-Chalk' were applied on 18 Apr. Late 'Nitro-Chalk' was applied on 10 June.

Basal applications: Manures: FYM at 50 t, (0:14:28) at 1880 kg. Weedkiller: Linuron at 1.1 kg in 280 l. Fungicide: Mancozeb at 1.3 kg in 300 l on five occasions with insecticide on the first, third, fourth and fifth occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: undiluted BOV at 170 l.

Seed: Pentland Crown.

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80/W/CS/253

Cultivations, etc.:- Subsoiled, tines 160 cm apart and 40 cm deep: 12 Aug, 1979. FYM applied, ploughed: 21 Aug. PK applied: 12 Apr, 1980. Heavy spring-tine cultivated: 14 Apr. Spring-tine cultivated with crumbler attached: 17 Apr. Rotary cultivated, potatoes planted: 21 Apr. Weedkiller applied: 15 May. Earthed up: 12 June. Fungicide applied: 18 June, 3 July, 22 July, 8 Aug, 22 Aug. Insecticide applied: 18 June, 22 July, 8 Aug, 22 Aug. Haulm mechanically destroyed: 19 Sept. Haulm desiccant applied: 23 Sept. Lifted: 13 Oct. Previous crops: Barley 1978, grass ley 1979.

NOTE: Dry matter of tubers and haulm and numbers of tubers were assessed on several occasions during the season. Nitrogen contents of tubers were measured.

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80/W/CS/253

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

N RATE / N FORM	200	300	MEAN
AQ U	62.9	75.9	69.4
AQ U+CS2	65.4	67.3	66.3
AQ U+NIT	64.5	73.6	69.0
NC E	67.4	76.9	72.2
NC E+L	70.4	75.3	72.8
IBDU	71.1	73.1	72.1
MEAN	67.0	73.7	70.3

EXTRA	NC E100	NC E400	NC EL100	NC EL400	MEAN
	54.4	71.2	63.3	78.3	66.8

GRAND MEAN 69.4

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	N FORM	N RATE	N FORM N RATE & EXTRA
SED	3.53	2.50	1.44	3.53

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	30	4.32	6.2

PERCENTAGE WARE 4.44 CM (1.75 INCH) RIDDLE

***** TABLES OF MEANS *****

N RATE / N FORM	200	300	MEAN
AQ U	91.1	94.9	93.0
AQ U+CS2	92.7	91.7	92.2
AQ U+NIT	92.8	94.0	93.4
NC E	92.1	92.7	92.4
NC E+L	94.2	93.9	94.0
IBDU	94.7	94.3	94.5
MEAN	92.9	93.6	93.3

EXTRA	NC E100	NC E400	NC EL100	NC EL400	MEAN
	90.0	92.3	92.8	95.0	92.5

GRAND MEAN 93.1

PLOT AREA HARVESTED 0.00260

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80/S/CS/1

FUNGICIDES, N AND GROWTH REGULATOR

Object: To study the effects of fungicides and of a growth regulator, and rates and times of applying nitrogen fertiliser on the incidence of foliar diseases and on the yield of w. barley - Saxmundham, Oldershaw's and Garner's plots.

Sponsors: F.V. Widdowson, J.F. Jenkyn, A. Penny.

The 15th year, w. barley.

For previous years see 66/C/30(t), 67/C/23(t), 68/C/39, 69-70/S/CS/1, 71/S/CS/1(t), 72/S/CS/1(t) and 73-79/S/CS/1.

Design: A single replicate of 24 plots split into 2, arranged as 2 blocks of 12 plots split into 2. Treatments to w. wheat 1966-1976 and to w. and s. barley 1977-1979 have been ignored.

Whole plot dimensions: 2.44 x 40.2.

Treatments: All combinations of:-

Whole plots

1. MILDFUNG		Fungicide to control mildew: Tridemorph at 0.53 kg in 280 l.
	NONE	None
	SPRAYED	Sprayed 23 Apr, 1980 and 14 May
2. E N RATE		Rates of early spring nitrogen fertiliser (kg N):
	105	
	140	
3. E N TIME		Times of applying early spring nitrogen fertiliser:
	FEB+MAR	35 kg on 12 Feb remainder on 25 Mar
	MAR	All on 25 Mar
4. APR N GR		Nitrogen fertiliser in April (kg N) and growth regulator:
	0 0	None
	35 0	35 on 23 Apr
	35 GR	35 on 23 Apr plus mepiquat chloride + ethephon ('Terpal' at 2.46 l) in 280 l on 23 Apr

Half plots

5. EYESFUNG		Fungicide to control eyespot: Carbendazim (as 'Bavistin' at 0.50 kg) in 280 l
	NONE	None
	SPRAYED	Sprayed 23 Apr

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80/S/CS/1

Basal applications: Manures: N, P_2O_5 & K_2O each at 51 kg as (15:15:15). Weedkillers: Chlortoluron at 5.6 kg in 220 l in autumn. 'Wheatclene' (1.26 kg of solid (metoxuron and simazine) plus 1.26 l of liquid (barban)) mixed with ioxynil at 1.3 kg plus mecoprop at 1.9 kg in 220 l.

Seed: Sonja, sown at 180 kg.

Cultivations, etc.:- Seed sown, NPK applied: 26 Sept, 1979. Chlortoluron applied: 27 Sept. Spring weedkillers applied: 31 Mar, 1980. Combine harvested: 29 July.

NOTE: Straw heights were measured in late June. N content of grain was measured.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

E N RATE	105	140	MEAN
MILDFUNG			
NONE	8.31	8.45	8.38
SPRAYED	8.23	8.75	8.49
MEAN	8.27	8.60	8.44

E N TIME	FEB+MAR	MAR	MEAN
MILDFUNG			
NONE	8.27	8.49	8.38
SPRAYED	8.41	8.58	8.49
MEAN	8.34	8.53	8.44

E N TIME	FEB+MAR	MAR	MEAN
E N RATE			
105	8.16	8.38	8.27
140	8.52	8.68	8.60
MEAN	8.34	8.53	8.44

APR N GR	0 0	35 0	35 GR	MEAN
MILDFUNG				
NONE	8.13	8.40	8.61	8.38
SPRAYED	7.99	8.61	8.87	8.49
MEAN	8.06	8.51	8.74	8.44

APR N GR	0 0	35 0	35 GR	MEAN
E N RATE				
105	7.79	8.47	8.54	8.27
140	8.33	8.54	8.93	8.60
MEAN	8.06	8.51	8.74	8.44

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80/S/CS/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APR N GR E N TIME	0 0	35 0	35 GR	MEAN
FEB+MAR	8.00	8.37	8.64	8.34
MAR	8.13	8.64	8.84	8.53
MEAN	8.06	8.51	8.74	8.44

EYESFUNG MILDFUNG	NONE	SPRAYED	MEAN
NONE	8.44	8.32	8.38
SPRAYED	8.38	8.60	8.49
MEAN	8.41	8.46	8.44

EYESFUNG E N RATE	NONE	SPRAYED	MEAN
105	8.22	8.32	8.27
140	8.60	8.60	8.60
MEAN	8.41	8.46	8.44

EYESFUNG E N TIME	NONE	SPRAYED	MEAN
FEB+MAR	8.31	8.36	8.34
MAR	8.50	8.56	8.53
MEAN	8.41	8.46	8.44

EYESFUNG APR N GR	NONE	SPRAYED	MEAN
0 0	8.02	8.11	8.06
35 0	8.53	8.48	8.51
35 GR	8.68	8.80	8.74
MEAN	8.41	8.46	8.44

E N RATE	105		140	
E N TIME	FEB+MAR	MAR	FEB+MAR	MAR
MILDFUNG				
NONE	8.14	8.48	8.40	8.50
SPRAYED	8.18	8.28	8.63	8.87

E N RATE	105			140		
APR N GR	0 0	35 0	35 GR	0 0	35 0	35 GR
MILDFUNG						
NONE	7.95	8.48	8.50	8.32	8.32	8.71
SPRAYED	7.63	8.47	8.59	8.35	8.76	9.15

E N TIME	FEB+MAR			MAR		
APR N GR	0 0	35 0	35 GR	0 0	35 0	35 GR
MILDFUNG						
NONE	8.11	8.18	8.51	8.16	8.62	8.70
SPRAYED	7.88	8.56	8.77	8.10	8.67	8.97

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80/S/CS/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

E N TIME	FEB+MAR			MAR		
APR N GR	0 0	35 0	35 GR	0 0	35 0	35 GR
E N RATE						
105	7.81	8.31	8.35	7.78	8.64	8.74
140	8.19	8.43	8.93	8.48	8.64	8.94

E N RATE	105		140	
EYESFUNG	NONE	SPRAYED	NONE	SPRAYED
MILDFUNG				
NONE	8.25	8.37	8.62	8.27
SPRAYED	8.20	8.26	8.57	8.93

E N TIME	FEB+MAR		MAR	
EYESFUNG	NONE	SPRAYED	NONE	SPRAYED
MILDFUNG				
NONE	8.37	8.17	8.50	8.48
SPRAYED	8.26	8.55	8.51	8.65

E N TIME	FEB+MAR		MAR	
EYESFUNG	NONE	SPRAYED	NONE	SPRAYED
E N RATE				
105	8.08	8.23	8.36	8.41
140	8.54	8.49	8.65	8.72

APR N GR	0 0		35 0		35 GR	
EYESFUNG	NONE	SPRAYED	NONE	SPRAYED	NONE	SPRAYED
MILDFUNG						
NONE	8.16	8.11	8.47	8.33	8.68	8.53
SPRAYED	7.88	8.10	8.59	8.63	8.68	9.06

APR N GR	0 0		35 0		35 GR	
EYESFUNG	NONE	SPRAYED	NONE	SPRAYED	NONE	SPRAYED
E N RATE						
105	7.66	7.92	8.40	8.55	8.60	8.49
140	8.38	8.29	8.65	8.42	8.76	9.10

APR N GR	0 0		35 0		35 GR	
EYESFUNG	NONE	SPRAYED	NONE	SPRAYED	NONE	SPRAYED
E N TIME						
FEB+MAR	7.97	8.03	8.49	8.25	8.48	8.80
MAR	8.07	8.18	8.56	8.72	8.88	8.79

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80/S/CS/1

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EYESFUNG	MILDFUNG* EYESFUNG	E N RATE* EYESFUNG	E N TIME* EYESFUNG
SED	0.091	0.129	0.129	0.129

TABLE	APR N GR* EYESFUNG	MILDFUNG* E N RATE EYESFUNG	MILDFUNG* E N TIME EYESFUNG	E N RATE* E N TIME EYESFUNG
SED	0.158	0.182	0.182	0.182

TABLE	MILDFUNG* APR N GR EYESFUNG	E N RATE* APR N GR EYESFUNG	E N TIME* APR N GR EYESFUNG
SED	0.223	0.223	0.223

* USE ONLY TO COMPARE THE TWO LEVELS OF EYESFUNG FOR THE SAME LEVEL(S) OF THE OTHER FACTOR(S)

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	9	0.316	3.7

GRAIN MEAN DM% 84.7

SUB PLOT AREA HARVESTED 0.00380

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80/R/WW/1 and 80/W/WW/1

WINTER WHEAT

VARIETIES AND N

Object: To study a selection of the newer varieties of w. wheat and the effects of nitrogen and chlormequat on them on land in rotation (pathogen free) and after wheat and barley (pathogen infected) - Rothamsted Gt Knott III (pathogen free RH) and Claycroft (pathogen infected RD), Woburn Horsepool (pathogen free WH).

Sponsors: R. Moffitt, R.J. Gutteridge, N. Magan.

Design: RH: 4 randomised blocks of 10 x 4 criss cross.
RD: 3 randomised blocks of 10 x 4 criss cross.
WH: 3 randomised blocks of 8 x 3 criss cross.

Whole plot dimensions: RH, RD 4.27 x 27.1
WH 4.27 x 20.1

Treatments: All combinations of:-

Column plots

1. VARIETY		Varieties (all seed purchased from standard commercial sources except as stated):
	ARMADA	Armada
	AVALON	Avalon
	BOUNTY	Bounty
	BRIGAND	Brigand
	FLANDERS	Flanders
	MARDLER	Mardler
	M HNT	Maris Huntsman
	M HNT OO	Maris Huntsman, once-grown at Rothamsted, seed crop not sprayed fungicide
	M HNT OF	Maris Huntsman, once-grown at Rothamsted, seed crop sprayed carbendazim + maneb + tridemorph (as 'Cosmic' at 4.0 kg) in 340 l applied twice.
	VIRTUE	Virtue

Row plots

2. N GR		Nitrogen fertiliser (kg N) and growth regulator:
	63	63
	126	126
	189	189
	189+C	189 + chlormequat at 1.7 l in 250 l on 7 May (RH, RD), at 1.4 l in 280 l on 24 Apr (WH).

NOTE: At Woburn Horsepool (WH) once-grown Maris Huntsman and N GR63 were not included and the nitrogen dressing for N GR126 was equally divided between April and May.

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80/R/WW/1 and 80/W/WW/1

Basal applications: Manures: Gt. Knott III (RH), Claycroft (RD) and Horsepool (WH): (0:20:20) at 310 kg, combine drilled. Weedkillers: Gt. Knott III (RH), Claycroft (RD): Paraquat at 0.56 kg ion in 220 l. Gt. Knott III (RH): Methabenzthiazuron at 1.6 kg in 220 l. Claycroft (RD): Mecoprop at 2.5 l in 250 l. Horsepool (WH): Mecoprop, bromoxynil with ioxynil (as 'Brittox' as 3.5 l in 250 l). Insecticide: Gt. Knott III (RH): Demeton-s-methyl at 0.24 kg in 280 l.

Seed: Gt. Knott III (RH), Claycroft (RD) and Horsepool (WH): Varieties sown at 190 kg.

Cultivations, etc.:-

Gt. Knott III (RH): Heavy spring-tine cultivated 24 Sept 1979, 25 Sept. Paraquat applied: 15 Oct. Spring-tine cultivated: 16 Oct. Seed sown: 17 Oct. Methabenzthiazuron applied: 20 Oct. N applied: 10 Apr, 1980. Insecticide applied: 23 June. Combine harvested: 23 Aug. Previous crops: S. barley 1978, w. oats 1979.

Claycroft (RD): Heavy spring-tine cultivated: 20 Sept, 1979, 4 Oct. Paraquat applied: 16 Oct. Rotary harrowed: 19 Oct. Seed sown: 20 Oct. N applied: 11 Apr, 1980. Mecoprop applied: 16 Apr. Combine harvested: 24 Aug. Previous crops: W. wheat 1978, s. barley 1979.

Horsepool (WH): Heavy spring-tine cultivated: 17 Oct, 1979. Spring-tine cultivated with crumbler attached, seed sown: 18 Oct. Weedkillers applied: 26 Mar, 1980. N applied: 6 Apr. Second half N to N GR126 applied: 2 May. Combine harvested: 27 Aug. Previous crops: W. oats 1978, potatoes 1979.

NOTE: Samples were taken in July on Claycroft (RD) for estimates of eyespot (Pseudocercosporella herpotrichoides) and take-all (Gaeumannomyces graminis).

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80/R/WW/1 GREAT KNOTT III (R)

HEALTHY SITE

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N GR / VARIETY	63	126	189	189+C	MEAN
ARMADA	7.36	8.94	8.95	10.38	8.91
AVALON	6.41	8.58	9.11	9.47	8.39
BOUNTY	6.89	8.71	8.66	9.66	8.48
BRIGAND	7.80	9.69	9.93	10.45	9.47
FLANDERS	6.53	8.14	8.50	9.32	8.12
MARDLER	6.66	8.94	8.98	9.76	8.58
M HNT	6.39	8.34	8.71	9.38	8.20
M HNT 00	6.88	8.52	8.80	9.76	8.49
M HNT OF	6.38	8.00	8.51	9.23	8.03
VIRTUE	7.68	9.53	10.22	10.24	9.42
MEAN	6.90	8.74	9.04	9.77	8.61

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N GR	VARIETY N GR
SED	0.310	0.170	0.383
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.243
N GR			0.348

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.VARIETY	27	0.438	5.1
BLOCK.N GR	9	0.240	2.8
BLOCK.VARIETY.N GR	81	0.258	3.0

GRAIN MEAN DM% 84.4

PLOT AREA HARVESTED 0.00173

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80/R/WW/1 CLAYCROFT (R)

DISEASED SITE

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N GR / VARIETY	63	126	189	189+C	MEAN
ARMADA	7.07	8.54	8.64	8.67	8.23
AVALON	7.90	8.48	9.50	8.99	8.72
BOUNTY	6.86	8.37	8.67	8.86	8.19
BRIGAND	8.25	9.59	9.49	9.42	9.19
FLANDERS	7.03	7.63	8.57	8.85	8.02
MARDLER	7.39	8.98	8.64	8.45	8.36
M HNT	7.89	8.68	8.43	9.03	8.50
M HNT 00	7.63	8.24	8.42	8.82	8.28
M HNT OF	7.72	8.70	8.58	9.03	8.51
VIRTUE	8.27	9.17	9.22	9.29	8.99
MEAN	7.60	8.64	8.81	8.94	8.50

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N GR	VARIETY N GR
SED	0.197	0.223	0.417
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.409
N GR			0.370

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.VARIETY	18	0.241	2.8
BLOCK.N GR	6	0.273	3.2
BLOCK.VARIETY.N GR	54	0.443	5.2

GRAIN MEAN DM% 84.6

PLOT AREA HARVESTED 0.00172

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80/W/WW/1 HORSEPOOL (W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N GR / VARIETY	126	189	189+C	MEAN
ARMADA	8.42	8.80	8.94	8.72
AVALON	7.91	8.44	8.44	8.26
BOUNTY	7.70	7.99	8.08	7.92
BRIGAND	8.89	9.05	8.73	8.89
FLANDERS	7.59	7.75	7.93	7.75
MARDLER	8.13	8.41	7.87	8.13
M HNT	8.50	8.27	8.66	8.47
VIRTUE	8.45	8.40	8.66	8.50
MEAN	8.20	8.39	8.41	8.33

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N GR	VARIETY N GR
SED	0.297	0.189	0.401
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.309
N GR			0.366

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.VARIETY	14	0.363	4.4
BLOCK.N GR	4	0.231	2.8
BLOCK.VARIETY.N GR	28	0.320	3.8

GRAIN MEAN DM% 84.9

PLOT AREA HARVESTED 0.00173

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80/R/WW/2 and 80/W/WW/2

WINTER WHEAT

AQUEOUS N AND NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to aqueous urea on the yield and nitrogen uptake of w. wheat - Rothamsted (R) Gt. Knott (III) and Woburn (W) Great Hill Bottom I.

Sponsors: F.V. Widdowson, A. Penny, G.A. Rodgers.

Design: 2 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 12.2.

Treatments: All combinations of:-

1. A S N	Nitrogen fertilisers (kg N) in autumn and spring:
100I + 100	100 in autumn, injected as aqueous urea, 100 in spring as 'Nitro-Chalk'
100I + 150	100 in autumn injected as aqueous urea, 150 in spring as 'Nitro-Chalk'
2. N INHIB	Nitrification inhibitors added to aqueous urea:
NONE	None
DIMEXAN	Dimexan (dimethyl xanthate) at 3.8 kg
NITRAPYR	Nitrapyrin at 1.4 kg
QUINOL	Quinol (hydroquinone) at 3.8 kg
STC+PEX	Sodium trithiocarbonate (equivalent to 3.2 kg carbon disulphide) plus potassium ethyl xanthate at 3.8 kg
THIRAM	Thiram at 3.8 kg

plus six extra plots given 'Nitro-Chalk' only (kg N):

EXTRA

0
NC 50
NC 100
NC 150
NC 200
NC 250

NOTE: 'Nitro- Chalk' dressings were divided, one-third in February, remainder in April.

Basal applications:
Gt. Knott III (R): Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Methabenzthiazuron at 1.6 kg in 220 l. Growth regulator: Chlormequat at 1.7 l in 250 l. Insecticide: Demeton-s-methyl 0.24 l in 250 l.
Gt. Hill Bottom I (W): Manures: (0:20:20) at 250 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in 250 l). Growth regulator: Chlormequat at 1.4 l in 280 l.

Seed: Gt. Knott III (R): Flanders, sown at 200 kg.
Gt. Hill Bottom I (W): Flanders, sown at 190 kg.

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80/R/WW/2 and 80/W/WW/2

Cultivations, etc.:-
Gt. Knott III (R): Aqueous N with inhibitors injected: 8 Oct, 1979. Paraquat applied: 15 Oct. Disc harrowed twice, seed sown: 18 Oct. Methabenzthiazuron applied: 20 Oct. First 'Nitro-Chalk' dressing applied: 19 Feb, 1980. Remaining 'Nitro-Chalk' applied: 8 Apr. Growth regulator applied: 7 May. Insecticide applied: 23 June. Combine harvested: 22 Aug. Previous crops: S. barley 1978, w. oats 1979.
Gt. Hill Bottom I (W): Heavy spring-tine cultivated: 12 Sept, 1979. Rotary cultivated: 21 Sept. PK applied: 27 Sept. Aqueous N with inhibitor injected: 9 Oct. Seed sown: 18 Oct. First 'Nitro-Chalk' dressing applied: 18 Feb, 1980. Weedkillers applied: 3 Mar. Remaining 'Nitro-Chalk' applied: 2 Apr. Growth regulator applied: 24 Apr. Combine harvested: 27 Aug. Previous crops: Potatoes and beans 1978, oats 1979.

NOTE: Soil samples were taken at monthly intervals, November to July for measurements of nitrate and ammonia.

80/R/WW/2 GT. KNOTT III

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N INHIB A S N	NONE	DIMEXAN	NITRAPYR	QUINOL	STC+PEX	THIRAM	MEAN
100I+100	7.94	7.37	7.51	7.32	7.45	7.41	7.50
100I+150	7.54	7.53	8.16	7.81	8.49	8.18	7.95
MEAN	7.74	7.45	7.83	7.57	7.97	7.79	7.72

EXTRA	0	NC 50	NC 100	NC 150	NC 200	NC 250	MEAN
	3.37	5.60	6.74	7.44	8.24	7.79	6.53

GRAND MEAN 7.33

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	A S N	N INHIB	A S N N INHIB & EXTRA
SED	0.252	0.103	0.178	0.252

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.252	3.4

GRAIN MEAN DM% 84.7

PLOT AREA HARVESTED 0.00279

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80/W/WW/2 GT. HILL BOTTOM I

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N INHIB A S N	NONE	DIMEXAN	NITRAPYR	QUINOL	STC+PEX	THIRAM	MEAN
100I+100	6.45	6.32	5.84	6.09	5.70	6.14	6.09
100I+150	6.30	6.40	6.23	5.85	6.53	6.54	6.31
MEAN	6.37	6.36	6.03	5.97	6.11	6.34	6.20

EXTRA	0	NC 50	NC 100	NC 150	NC 200	NC 250	MEAN
	3.23	4.45	5.98	6.54	6.23	6.19	5.44

GRAND MEAN 5.95

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	A S N	N INHIB	A S N N INHIB & EXTRA
SED	0.480	0.196	0.340	0.480

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	17	0.480	8.1

GRAIN MEAN DM% 83.6

PLOT AREA HARVESTED 0.00279

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80/R/WW/3

WINTER WHEAT

FACTORS LIMITING YIELD

Object: To study the effects of a range of factors on the incidence of pests and diseases and on the growth and yield of w. wheat - Great Knott I.

Sponsors: B. M. Church, A. Dewar, J. Lacey, A. Penny, R.T. Plumb, R. D. Prew, G.N. Thorne, A. D. Todd, T.D. Williams.

Associate sponsors: P.J. Welbank, F.V. Widdowson, D.S. Jenkinson.

Design: Half replicate of 2^8 + 26 extra plots, arranged in four blocks, two of 38 plots, 2 of 39 plots.

Whole plot dimensions: 3.3 x 15.2.

Treatments: Combinations of:-

1.	SOWDATE	Dates of sowing:
	20 SEPT	20 September, 1979
	19 OCT	19 October
2.	TOTAL N	Total amount of nitrogen fertiliser (kg N) applied:
	105	
	175	
3.	N DIVIS	Division of total nitrogen fertiliser:
	SINGLE	Single dressing
	DIVIDED	40 kg of the total before single dressing, 25 kg of the total after single dressing, remainder on single dressing date
4.	N TIME	Time of applying single dressing of nitrogen fertiliser:
	EARLY	At ear initiation of SOW DATE 20 SEP
	LATE	At ear initiation of SOW DATE 19 OCT
5.	AUT PEST	Autumn pesticide:
	NONE	None
	ALDICARB	Aldicarb at 5 kg worked in to seedbed
6.	APHICIDE	Aphicide:
	NONE	None
	PIRIMICA	Pirimicarb at 0.14 kg on 18 June, 1980
7.	FUNGCIDE	Fungicides:
	NONE	None
	CA+MA+TR	Carbendazim + maneb + tridemorph (as 'Cosmic' at 4.0 kg) + captafol at 1.0 kg applied on 9 May and on 18 June

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8. IRRIGATN — Irrigation:

NONE	None
FULL	Full (150 mm) to lessen a deficit of 25 mm to 12.5 mm

plus all combinations of the following (all given single N dressing, aldicarb, pirimicarb, carbendazim + maneb + tridemorph and captafol, no irrigation):

1. SOWDATEX — Dates of sowing:

20 SEPT	20 September, 1979
19 OCT	19 October

2. TOTAL NX — Total amount of nitrogen fertiliser (kg N):

35
70
105
140
175
210

3. N TIMEX — Time of applying nitrogen fertiliser:

EARLY	At ear initiation of SOWDATE 20 SEP
LATE	At ear initiation of SOWDATE 19 OCT

plus two extra plots (both given aldicarb, pirimicarb, carbendazim + maneb + tridemorph and captafol, no irrigation):

NO 20 SEPT	Sown 20 September, given no nitrogen
NO 19 OCT	Sown 19 October, given no nitrogen

NOTES: (1) Irrigation treatments were as follows:-

	mm
13 May	50
22 May	25
29 May	25
5 June	13
13 June	25
26 June	12
	150

(2) Nitrogen applications were as follows:-

	N DIVIS	
	SINGLE	DIVIDED
SOWDATE 20 SEP	4 Mar	30 Jan, 4 Mar, 6 May
SOWDATE 19 OCT	15 Apr	4 Mar, 15 Apr, 20 May

(3) All treatment sprays were applied in 340 l.

Basal applications: Manures: (0:14:28) at 360 kg. Weedkillers: Methabenzthiazuron at 1.6 kg in 220 l. Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 340 l. Growth regulator: Chlormequat

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at 1.4 kg applied at Zadoks growth stage 30, with the 'Brittox'.

Seed: Hustler, sown at 380 seeds per square metre, with stanhay precision drill.

Cultivations, etc.:- PK applied, heavy spring-tine cultivated twice: 13 Sept, 1979. Aldicarb applied for the first sowing and these plots rotary harrowed: 18 Sept. Aldicarb applied for the second sowing and these plots rotary harrowed: 16 Oct. Methabenzthiazuron applied: 25 Oct. 'Brittox' and growth regulator applied to first sowing: 2 April, 1980. 'Brittox' and growth regulator applied to second sowing: 24 Apr. Combine harvested: 22 and 24 Aug. Previous crops: S. beans 1978, potatoes 1979.

NOTE: Soil was sampled for nematodes, and mineral N. Plants were sampled for foot and root rots. The above-ground crop was examined for growth stage, aphids, foliar diseases and general microflora. Light interception, dry weight, leaf area, and N and K content of the above-ground crop and stem nitrate were measured on several occasions.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TOTAL N	105	175	MEAN
SOWDATE			
20 SEPT	9.97	10.28	10.12
19 OCT	8.90	9.31	9.10
MEAN	9.43	9.80	9.61

N DIVIS	SINGLE	DIVIDED	MEAN
SOWDATE			
20 SEPT	10.11	10.14	10.12
19 OCT	9.04	9.17	9.10
MEAN	9.57	9.66	9.61

N DIVIS	SINGLE	DIVIDED	MEAN
TOTAL N			
105	9.39	9.48	9.43
175	9.76	9.83	9.80
MEAN	9.57	9.66	9.61

N TIME	EARLY	LATE	MEAN
SOWDATE			
20 SEPT	9.69	10.56	10.12
19 OCT	9.07	9.13	9.10
MEAN	9.38	9.85	9.61

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N TIME	EARLY	LATE	MEAN
TOTAL N			
105	9.21	9.66	9.43
175	9.55	10.04	9.80
MEAN	9.38	9.85	9.61

N TIME	EARLY	LATE	MEAN
N DIVIS			
SINGLE	9.28	9.87	9.57
DIVIDED	9.48	9.83	9.66
MEAN	9.38	9.85	9.61

AUT PEST	NONE	ALDICARB	MEAN
SOWDATE			
20 SEPT	10.16	10.09	10.12
19 OCT	9.08	9.12	9.10
MEAN	9.62	9.61	9.61

AUT PEST	NONE	ALDICARB	MEAN
TOTAL N			
105	9.43	9.44	9.43
175	9.81	9.78	9.80
MEAN	9.62	9.61	9.61

AUT PEST	NONE	ALDICARB	MEAN
N DIVIS			
SINGLE	9.58	9.57	9.57
DIVIDED	9.66	9.65	9.66
MEAN	9.62	9.61	9.61

AUT PEST	NONE	ALDICARB	MEAN
N TIME			
EARLY	9.39	9.37	9.38
LATE	9.85	9.85	9.85
MEAN	9.62	9.61	9.61

APHICIDE	NONE	PIRIMICA	MEAN
SOWDATE			
20 SEPT	10.02	10.23	10.12
19 OCT	9.08	9.13	9.10
MEAN	9.55	9.68	9.61

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APHICIDE TOTAL N	NONE	PIRIMICA	MEAN
105	9.37	9.49	9.43
175	9.72	9.87	9.80
MEAN	9.55	9.68	9.61

APHICIDE N DIVIS	NONE	PIRIMICA	MEAN
SINGLE	9.51	9.63	9.57
DIVIDED	9.58	9.73	9.66
MEAN	9.55	9.68	9.61

APHICIDE N TIME	NONE	PIRIMICA	MEAN
EARLY	9.34	9.42	9.38
LATE	9.75	9.94	9.85
MEAN	9.55	9.68	9.61

APHICIDE AUT PEST	NONE	PIRIMICA	MEAN
NONE	9.59	9.65	9.62
ALDICARB	9.50	9.71	9.61
MEAN	9.55	9.68	9.61

FUNGCIDE SOWDATE	NONE	CA+MA+TR	MEAN
20 SEPT	9.73	10.52	10.12
19 OCT	8.72	9.49	9.10
MEAN	9.22	10.01	9.61

FUNGCIDE TOTAL N	NONE	CA+MA+TR	MEAN
105	9.15	9.71	9.43
175	9.29	10.30	9.80
MEAN	9.22	10.01	9.61

FUNGCIDE N DIVIS	NONE	CA+MA+TR	MEAN
SINGLE	9.17	9.97	9.57
DIVIDED	9.27	10.04	9.66
MEAN	9.22	10.01	9.61

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE N TIME	NONE	CA+MA+TR	MEAN
EARLY	8.99	9.77	9.38
LATE	9.46	10.24	9.85
MEAN	9.22	10.01	9.61

FUNGCIDE AUT PEST	NONE	CA+MA+TR	MEAN
NONE	9.29	9.95	9.62
ALDICARB	9.16	10.06	9.61
MEAN	9.22	10.01	9.61

FUNGCIDE APHICIDE	NONE	CA+MA+TR	MEAN
NONE	9.12	9.97	9.55
PIRIMICA	9.32	10.04	9.68
MEAN	9.22	10.01	9.61

IRRIGATN SOWDATE	NONE	FULL	MEAN
20 SEPT	10.27	9.98	10.12
19 OCT	9.08	9.12	9.10
MEAN	9.68	9.55	9.61

IRRIGATN TOTAL N	NONE	FULL	MEAN
105	9.43	9.43	9.43
175	9.92	9.67	9.80
MEAN	9.68	9.55	9.61

IRRIGATN N DIVIS	NONE	FULL	MEAN
SINGLE	9.68	9.47	9.57
DIVIDED	9.67	9.64	9.66
MEAN	9.68	9.55	9.61

IRRIGATN N TIME	NONE	FULL	MEAN
EARLY	9.36	9.40	9.38
LATE	9.99	9.71	9.85
MEAN	9.68	9.55	9.61

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN	NONE	FULL	MEAN
AUT PEST			
NONE	9.65	9.59	9.62
ALDICARB	9.70	9.52	9.61
MEAN	9.68	9.55	9.61

IRRIGATN	NONE	FULL	MEAN
APHICIDE			
NONE	9.59	9.51	9.55
PIRIMICA	9.76	9.60	9.68
MEAN	9.68	9.55	9.61

IRRIGATN	NONE	FULL	MEAN
FUNGCIDE			
NONE	9.40	9.04	9.22
CA+MA+TR	9.95	10.06	10.01
MEAN	9.68	9.55	9.61

TOTAL N	105		175	
N DIVIS	SINGLE	DIVIDED	SINGLE	DIVIDED
SOWDATE				
20 SEPT	9.95	9.99	10.27	10.29
19 OCT	8.83	8.97	9.25	9.37

TOTAL N	105		175	
N TIME	EARLY	LATE	EARLY	LATE
SOWDATE				
20 SEPT	9.62	10.32	9.76	10.80
19 OCT	8.80	8.99	9.35	9.27

N DIVIS	SINGLE		DIVIDED	
N TIME	EARLY	LATE	EARLY	LATE
SOWDATE				
20 SEPT	9.65	10.57	9.73	10.56
19 OCT	8.90	9.17	9.24	9.10

N DIVIS	SINGLE		DIVIDED	
N TIME	EARLY	LATE	EARLY	LATE
TOTAL N				
105	9.09	9.69	9.33	9.63
175	9.47	10.05	9.64	10.03

TOTAL N	105		175	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
SOWDATE				
20 SEPT	10.01	9.93	10.30	10.26
19 OCT	8.84	8.95	9.33	9.29

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N DIVIS	SINGLE		DIVIDED	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
SOWDATE				
20 SEPT	10.13	10.08	10.18	10.10
19 OCT	9.03	9.05	9.14	9.20

N DIVIS	SINGLE		DIVIDED	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
TOTAL N				
105	9.37	9.40	9.48	9.48
175	9.79	9.73	9.84	9.82

N TIME	EARLY		LATE	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
SOWDATE				
20 SEPT	9.74	9.64	10.57	10.55
19 OCT	9.04	9.10	9.12	9.15

N TIME	EARLY		LATE	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
TOTAL N				
105	9.20	9.21	9.65	9.67
175	9.58	9.53	10.05	10.03

N TIME	EARLY		LATE	
AUT PEST	NONE	ALDICARB	NONE	ALDICARB
N DIVIS				
SINGLE	9.22	9.34	9.94	9.79
DIVIDED	9.57	9.40	9.75	9.90

TOTAL N	105		175	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
20 SEPT	9.86	10.08	10.18	10.39
19 OCT	8.88	8.91	9.27	9.35

N DIVIS	SINGLE		DIVIDED	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
20 SEPT	10.07	10.15	9.97	10.31
19 OCT	8.96	9.11	9.19	9.15

N DIVIS	SINGLE		DIVIDED	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
TOTAL N				
105	9.31	9.47	9.44	9.52
175	9.72	9.80	9.73	9.94

N TIME	EARLY		LATE	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
20 SEPT	9.66	9.71	10.37	10.75
19 OCT	9.02	9.12	9.13	9.14

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N TIME	EARLY		LATE	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
TOTAL N				
105	9.14	9.27	9.60	9.71
175	9.54	9.56	9.90	10.18

N TIME	EARLY		LATE	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
N DIVIS				
SINGLE	9.28	9.27	9.75	9.99
DIVIDED	9.41	9.56	9.76	9.90

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
SOWDATE				
20 SEPT	10.12	10.19	9.91	10.28
19 OCT	9.06	9.11	9.10	9.15

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
TOTAL N				
105	9.35	9.50	9.39	9.49
175	9.83	9.80	9.61	9.94

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
N DIVIS				
SINGLE	9.60	9.56	9.43	9.70
DIVIDED	9.58	9.74	9.58	9.72

AUT PEST	NONE		ALDICARB	
APHICIDE	NONE	PIRIMICA	NONE	PIRIMICA
N TIME				
EARLY	9.37	9.41	9.32	9.42
LATE	9.81	9.88	9.69	10.01

TOTAL N	105		175	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
20 SEPT	9.71	10.23	9.75	10.81
19 OCT	8.60	9.20	8.84	9.78

N DIVIS	SINGLE		DIVIDED	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
20 SEPT	9.68	10.54	9.78	10.50
19 OCT	8.66	9.41	8.77	9.57

N DIVIS	SINGLE		DIVIDED	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
105	9.07	9.70	9.23	9.73
175	9.27	10.25	9.32	10.35

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N TIME	EARLY		LATE	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
20 SEPT	9.26	10.12	10.20	10.92
19 OCT	8.72	9.42	8.71	9.56

N TIME	EARLY		LATE	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
105	9.00	9.41	9.30	10.01
175	8.98	10.13	9.61	10.47

N TIME	EARLY		LATE	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N DIVIS				
SINGLE	8.85	9.71	9.50	10.24
DIVIDED	9.13	9.84	9.42	10.24

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
20 SEPT	9.85	10.46	9.61	10.58
19 OCT	8.73	9.44	8.70	9.54

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
105	9.18	9.67	9.12	9.76
175	9.40	10.23	9.19	10.37

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N DIVIS				
SINGLE	9.26	9.90	9.08	10.05
DIVIDED	9.32	10.00	9.23	10.08

AUT PEST	NONE		ALDICARB	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N TIME				
EARLY	9.09	9.70	8.89	9.85
LATE	9.50	10.20	9.42	10.28

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
SOWDATE				
20 SEPT	9.56	10.48	9.90	10.56
19 OCT	8.69	9.47	8.75	9.51

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
TOTAL N				
105	9.06	9.69	9.25	9.74
175	9.19	10.25	9.40	10.34

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N DIVIS				
SINGLE	9.06	9.97	9.29	9.98
DIVIDED	9.19	9.97	9.36	10.10

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
N TIME				
EARLY	8.95	9.73	9.02	9.81
LATE	9.29	10.21	9.62	10.27

APHICIDE	NONE		PIRIMICA	
FUNGCIDE	NONE	CA+MA+TR	NONE	CA+MA+TR
AUT PEST				
NONE	9.25	9.93	9.33	9.97
ALDICARB	9.00	10.01	9.31	10.11

TOTAL N	105		175	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
20 SEPT	10.01	9.92	10.52	10.04
19 OCT	8.85	8.94	9.32	9.30

N DIVIS	SINGLE		DIVIDED	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
20 SEPT	10.30	9.92	10.24	10.05
19 OCT	9.06	9.02	9.11	9.23

N DIVIS	SINGLE		DIVIDED	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
105	9.44	9.34	9.43	9.53
175	9.92	9.60	9.92	9.74

N TIME	EARLY		LATE	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
20 SEPT	9.79	9.59	10.75	10.37
19 OCT	8.94	9.21	9.23	9.04

N TIME	EARLY		LATE	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
105	9.12	9.29	9.74	9.57
175	9.60	9.50	10.24	9.84

N TIME	EARLY		LATE	
IRRIGATN	NONE	FULL	NONE	FULL
N DIVIS				
SINGLE	9.30	9.26	10.06	9.68
DIVIDED	9.43	9.53	9.91	9.74

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
20 SEPT	10.23	10.09	10.31	9.88
19 OCT	9.08	9.09	9.09	9.16

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
105	9.39	9.46	9.47	9.41
175	9.91	9.71	9.93	9.63

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
N DIVIS				
SINGLE	9.68	9.48	9.67	9.46
DIVIDED	9.62	9.70	9.73	9.58

AUT PEST	NONE		ALDICARB	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
EARLY	9.37	9.41	9.36	9.38
LATE	9.94	9.76	10.04	9.66

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
20 SEPT	10.20	9.84	10.34	10.12
19 OCT	8.98	9.17	9.19	9.07

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
105	9.37	9.37	9.49	9.49
175	9.81	9.64	10.03	9.70

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
N DIVIS				
SINGLE	9.60	9.43	9.76	9.51
DIVIDED	9.58	9.59	9.77	9.69

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
EARLY	9.35	9.33	9.38	9.46
LATE	9.83	9.68	10.15	9.74

APHICIDE	NONE		PIRIMICA	
IRRIGATN	NONE	FULL	NONE	FULL
AUT PEST				
NONE	9.56	9.62	9.74	9.56
ALDICARB	9.61	9.39	9.78	9.64

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80/R/WW/3

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
SOWDATE				
20 SEPT	10.00	9.46	10.54	10.51
19 OCT	8.81	8.63	9.36	9.62

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
TOTAL N				
105	9.27	9.03	9.59	9.83
175	9.54	9.05	10.31	10.29

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
N DIVIS				
SINGLE	9.40	8.94	9.96	9.99
DIVIDED	9.41	9.14	9.94	10.13

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
N TIME				
EARLY	9.09	8.89	9.64	9.91
LATE	9.72	9.20	10.26	10.22

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
AUT PEST				
NONE	9.41	9.17	9.89	10.00
ALDICARB	9.40	8.92	10.00	10.12

FUNGCIDE	NONE		CA+MA+TR	
IRRIGATN	NONE	FULL	NONE	FULL
APHICIDE				
NONE	9.25	9.00	9.93	10.01
PIRIMICA	9.56	9.09	9.97	10.11

TOTAL NX	35	70	105	140	175	210	MEAN
SOWDATEX							
20 SEPT	8.39	9.68	10.33	10.99	10.85	11.13	10.23
19 OCT	7.62	8.09	9.86	10.22	9.57	9.82	9.20
MEAN	8.00	8.88	10.09	10.60	10.21	10.48	9.71

N TIMEX	EARLY	LATE	MEAN
SOWDATEX			
20 SEPT	9.92	10.53	10.23
19 OCT	8.81	9.58	9.20
MEAN	9.37	10.06	9.71

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80/R/WW/3

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N TIMEX TOTAL NX	EARLY	LATE	MEAN
35	8.04	7.97	8.00
70	8.80	8.97	8.88
105	9.48	10.71	10.09
140	10.25	10.96	10.60
175	9.68	10.74	10.21
210	9.97	10.99	10.48
MEAN	9.37	10.06	9.71

SOWDATEX	N TIMEX TOTAL NX	EARLY	LATE
20 SEPT	35	8.74	8.04
	70	9.66	9.69
	105	9.57	11.09
	140	10.78	11.20
	175	10.24	11.47
	210	10.55	11.71
19 OCT	35	7.34	7.90
	70	7.93	8.26
	105	9.39	10.33
	140	9.71	10.72
	175	9.13	10.02
	210	9.39	10.26

NO 20 SEPT 7.09
NO 19 OCT 6.58

GRAND MEAN 9.59

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

SED FOR ALL TABLES EXCEPT THOSE INVOLVING FACTORS SOWDATEX, N TIMEX OR TOTAL NX

ONE FACTOR TABLES	0.058
TWO FACTOR TABLES	0.083
THREE FACTOR TABLES	0.117

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	32	0.331	3.4

GRAIN MEAN DM% 83.9

PLOT AREA HARVESTED 0.00189

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80/W/WW/3

WINTER WHEAT

GROWTH AND YIELD ON A CONTRASTED SITE

Object: To study on a contrasted site the effects of some of the factors tested in 80/R/WW/3 Factors Limiting Yield and to determine the extent to which differences between the sites can be eliminated by appropriate combinations of the factors - Woburn Broad Mead I.

Sponsors: P.J. Welbank, F.V. Widdowson.

Design: Half replicate of 2^6 + 12 extra plots.

Whole plot dimensions: 3.25 x 15.24.

Treatments: Combinations of:-

1.	SOWDATE	Dates of sowing:
	12 OCT	12 October, 1979
	30 OCT	30 October
2.	TOTAL N	Total amounts of nitrogen fertiliser (kg N) applied:
	90	
	150	
3.	N DIVIS	Division of total nitrogen fertiliser:
	SINGLE	Single dressing
	DIVIDED	40 kg of the total before single dressing, 25 kg of the total after single dressing, remainder on single dressing date
4.	N TIME	Time of applying single dressing of nitrogen fertiliser
	EARLY	At ear initiation of SOWDATE 12 OCT
	LATE	At ear initiation of SOWDATE 30 OCT
5.	AUT PEST	Autumn pesticide:
	NONE	None
	ALDICARB	Aldicarb at 5 kg worked in to seedbed
6.	IRRIGATN	Irrigation:
	NONE	None
	FULL	Full (164 mm) to lessen a deficit of 25 mm to 12.5 mm

plus all combinations of the following (all given N as a single dressing at ear initiation of late sown crop, aldicarb to seedbed but not irrigation):

1.	SOWDATEX	Dates of sowing:
	12 OCT	
	30 OCT	

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80/W/WW/3

2. TOTAL NX Total amount of nitrogen fertiliser (kg N):

0
45
90
120
150
180

Irrigation was applied as follows (mm water):

16 May	25
18 May	12.5
19 May	12.5
21 May	12.5
22 May	12.5
28 May	25
29 May	15
3 June	15
13 June	16
23 June	8
25 July	10
Total	164

NOTE: Nitrogen appliciations were as follows:

	N DIVIS	
	SINGLE	DIVIDED
SOWDATE 12 OCT	5 Mar	31 Jan, 5 Mar, 8 May
SOWDATE 30 OCT	16 Apr	5 Mar, 16 Apr, 21 May

Standard applications: Manures: (0:20:20) at 310 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil ('Brittox' at 3.5 l in 340 l to SE plots and in 280 l to SL plots). Isoproturon at 2.1 l in 280 l. Growth regulator: Chlormequat at 1.4 l in 280 l. Fungicides: Carbendazim, tridemorph and maneb ('Cosmic' at 4 kg in 250 l) applied three times, with captafol at 0.95 kg on the first occasion, with insecticide on the second and third occasion. Insecticide: Pirimicarb at 0.14 kg.

Seed: Hustler, sown at 160 kg.

Cultivations, etc.:- Heavy spring-tine cultivated twice: 6 Oct, 1979. PK applied, aldicarb applied for SOW DATE 12 OCT and all plots rotary cultivated: 8 Oct. Spring-tine cultivated all plots: 12 Oct. Aldicarb applied for SOW DATE 30 OCT. Spring-tine cultivated with crumbler attached these plots only: 29 Oct. 'Brittox' applied to SOW DATE 12 OCT: 20 Feb, 1980. Isoproturon applied to all plots: 11 Apr. 'Brittox' applied to SOW DATE 30 OCT, growth regulator applied to SOW DATE 12 OCT: 24 Apr. 'Cosmic' and captafol applied: 9 May. Growth regulator applied to SOW DATE 30 OCT: 13 May. 'Cosmic' and insecticide applied: 19 June, 10 July. Combine harvested: 26 Aug. Previous crops: W. oats 1978, potatoes 1979.

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80/W/WW/3

NOTE: Measurements were made of plant and shoot numbers, dry weight of tops and ears, leaf areas and N, P and K content three times during growing season. Weekly measurements were made for soil moisture and plant moisture stress (between April and harvest). Disease assessments were made during the growing season. Soil samples were taken in autumn and spring before fertiliser application to determine their N content.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TOTAL N	90	150	MEAN
SOWDATE			
12 OCT	8.64	9.02	8.83
30 OCT	8.06	8.37	8.22
MEAN	8.35	8.70	8.52

N DIVIS	SINGLE	DIVIDED	MEAN
SOWDATE			
12 OCT	9.08	8.58	8.83
30 OCT	8.29	8.14	8.22
MEAN	8.68	8.36	8.52

N DIVIS	SINGLE	DIVIDED	MEAN
TOTAL N			
90	8.57	8.13	8.35
150	8.80	8.60	8.70
MEAN	8.68	8.36	8.52

N TIME	EARLY	LATE	MEAN
SOWDATE			
12 OCT	8.57	9.09	8.83
30 OCT	8.12	8.31	8.22
MEAN	8.35	8.70	8.52

N TIME	EARLY	LATE	MEAN
TOTAL N			
90	8.12	8.57	8.35
150	8.57	8.83	8.70
MEAN	8.35	8.70	8.52

N TIME	EARLY	LATE	MEAN
N DIVIS			
SINGLE	8.49	8.88	8.68
DIVIDED	8.21	8.52	8.36
MEAN	8.35	8.70	8.52

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80/W/WW/3

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

AUT PEST SOWDATE	NONE	ALDICARB	MEAN
12 OCT	8.76	8.90	8.83
30 OCT	8.31	8.12	8.22
MEAN	8.54	8.51	8.52

AUT PEST TOTAL N	NONE	ALDICARB	MEAN
90	8.38	8.32	8.35
150	8.69	8.70	8.70
MEAN	8.54	8.51	8.52

AUT PEST N DIVIS	NONE	ALDICARB	MEAN
SINGLE	8.58	8.79	8.68
DIVIDED	8.49	8.23	8.36
MEAN	8.54	8.51	8.52

AUT PEST N TIME	NONE	ALDICARB	MEAN
EARLY	8.27	8.42	8.35
LATE	8.80	8.59	8.70
MEAN	8.54	8.51	8.52

IRRIGATN SOWDATE	NONE	FULL	MEAN
12 OCT	8.90	8.76	8.83
30 OCT	8.15	8.28	8.22
MEAN	8.53	8.52	8.52

IRRIGATN TOTAL N	NONE	FULL	MEAN
90	8.29	8.40	8.35
150	8.76	8.64	8.70
MEAN	8.53	8.52	8.52

IRRIGATN N DIVIS	NONE	FULL	MEAN
SINGLE	8.76	8.61	8.68
DIVIDED	8.30	8.43	8.36
MEAN	8.53	8.52	8.52

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80/W/WW/3

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

IRRIGATN	NONE	FULL	MEAN
N TIME			
EARLY	8.29	8.40	8.35
LATE	8.76	8.64	8.70
MEAN	8.53	8.52	8.52

IRRIGATN	NONE	FULL	MEAN
AUT PEST			
NONE	8.43	8.64	8.54
ALDICARB	8.62	8.40	8.51
MEAN	8.53	8.52	8.52

TOTAL NX	0	45	90	120	150	180	MEAN
SOWDATEX							
12 OCT	5.99	8.10	7.77	8.88	9.28	8.86	8.15
30 OCT	6.54	6.90	7.43	7.36	8.34	8.53	7.51
MEAN	6.26	7.50	7.60	8.12	8.81	8.69	7.83

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

SED FOR ALL TABLES EXCEPT TOTAL NX.SOWDATEX
ONE FACTOR TABLES 0.102
TWO FACTOR TABLES 0.145

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP	10	0.289	3.4

GRAIN MEAN DM% 84.2

PLOT AREA HARVESTED 0.00139

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80/R/WW/4

WINTER WHEAT

SEED RATES AND DIVIDED N DRESSINGS

Object: To study the effects of a range of rates of early nitrogen dressings on the growth and yield of w. wheat sown at half or standard seed rate - Gt. Knott III.

Sponsors: J. McEwen, R. Moffitt.

Design: 2 randomised blocks of 24 plots.

Whole plot dimensions: 4.27 x 8.08.

Treatments: All combinations of:-

1. SEEDRATE Seed rates (kg):

   100
   200

2. EARLY N Nitrogen fertiliser applied 4 Mar, 1980 (kg N):

    0
   25
   50
   75

3. APRIL N Nitrogen fertiliser applied 14 Apr (kg N):

    75
   100
   125

Basal applications: Manures: (0:20:20) at 310 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Methabenzthiazuron at 1.5 kg in 220 l. Isoproturon at 2.9 kg in 250 l. Fungicide: Triadimefon at 0.13 kg in 250 l. Insecticide: Demeton-s-methyl at 0.24 kg in 250 l. Growth regulator: Chlormequat at 1.7 l in 250 l.

Seed: Flanders.

Cultivations, etc.:- Heavy spring-tine cultivated twice: 24 Sept, 1979. Paraquat applied: 15 Oct. PK applied, spring-tine cultivated, seed sown: 22 Oct. Methabenzthiazuron applied: 24 Oct. Isoproturon applied: 24 Apr, 1980. Growth regulator applied: 7 May. Fungicide applied: 3 June. Insecticide applied: 23 June. Combine harvested: 22 Aug. Previous crops: S. barley 1978, s. oats 1979.

NOTES: (1) Plant counts were made in January, tiller counts in April and ear counts in July.
(2) 1000 grain weights and N content of grain were measured.

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80/R/WW/4

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

EARLY N / SEEDRATE	0	25	50	75	MEAN
100	6.66	7.32	7.94	7.83	7.44
200	7.22	7.36	7.80	7.86	7.56
MEAN	6.94	7.34	7.87	7.85	7.50

APRIL N / SEEDRATE	75	100	125	MEAN
100	7.29	7.38	7.64	7.44
200	7.13	7.68	7.87	7.56
MEAN	7.21	7.53	7.76	7.50

APRIL N / EARLY N	75	100	125	MEAN
0	6.56	6.96	7.31	6.94
25	6.87	7.46	7.69	7.34
50	7.65	8.10	7.85	7.87
75	7.77	7.59	8.18	7.85
MEAN	7.21	7.53	7.76	7.50

SEEDRATE / APRIL N / EARLY N	75	100	125
100	0	6.22	6.67	7.10
	25	7.12	7.36	7.47
	50	8.05	7.94	7.84
	75	7.77	7.56	8.16
200	0	6.90	7.25	7.51
	25	6.62	7.57	7.90
	50	7.25	8.27	7.86
	75	7.77	7.62	8.20

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEEDRATE	EARLY N	APRIL N	SEEDRATE EARLY N
SED	0.089	0.126	0.109	0.178

TABLE	SEEDRATE APRIL N	EARLY N APRIL N	SEEDRATE EARLY N APRIL N
SED	0.154	0.218	0.308

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	23	0.308	4.1

GRAIN MEAN DM% 84.0 PLOT AREA HARVESTED 0.00246

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80/W/WW/4

WINTER WHEAT

NEMATICIDES AT SOWING

Object: To study the effects of applying fumigants and non-fumigant nematicides on the control of parasitic nematodes and on the yield of w. wheat - Far Field II.

Sponsor: A.G. Whitehead.

Design: 3 randomised blocks of 26 plots.

Whole plot dimensions: 2.28 x 7.62.

Treatments:

TREATMNT	
OX1 CD 7	Oxamyl at 0.5 kg combine drilled, rows 7 inches (18 cm) apart
OX2 CD 7	Oxamyl at 1.0 kg combine drilled, rows 7 inches (18 cm) apart
OX4 CD 7	Oxamyl at 2.0 kg combine drilled, rows 7 inches (18 cm) apart
OX6 CD 7	Oxamyl at 3.0 kg combine drilled, rows 7 inches (18 cm) apart
AL1 CD 7	Aldicarb at 0.5 kg combine drilled, rows 7 inches (18 cm) apart
AL2 CD 7	Aldicarb at 1.0 kg combine drilled, rows 7 inches (18 cm) apart
AL4 CD 7	Aldicarb at 2.0 kg combine drilled, rows 7 inches (18 cm) apart
AL6 CD 7	Aldicarb at 3.0 kg combine drilled, rows 7 inches (18 cm) apart
AL2 BC 7	Aldicarb at 1.0 kg broadcast and raked in, rows 7 inches (18 cm) apart
AL4 BC 7	Aldicarb at 2.0 kg broadcast and raked in, rows 7 inches (18 cm) apart
AL8 BC 7	Aldicarb at 4.0 kg broadcast and raked in, rows 7 inches (18 cm) apart
AL1 SB 7	Aldicarb at 0.5 kg surface applied in 75 mm bands over the rows, rows 7 inches (18 cm) apart
AL2 SB 7	Aldicarb at 1.0 kg surface applied in 75 mm bands over the rows, rows 7 inches (18 cm) apart
AL4 SB 7	Aldicarb at 2.0 kg surface applied in 75 mm bands over the rows, rows 7 inches (18 cm) apart
M1 I 7	Metham sodium at 92 l injected in the row, rows 7 inches (18 cm) apart
M2 I 7	Metham sodium at 184 l injected in the row, rows 7 inches (18 cm) apart
T1 I 7	'Telone II' at 92 l injected in the row, rows 7 inches (18 cm) apart
T2 I 7	'Telone II' at 184 l injected in the row, rows 7 inches (18 cm) apart
M1 I 5/9	Metham sodium at 92 l injected between rows of a pair. Rows of a pair were 5 inches (13 cm) apart and pairs were separated by 9 inches (23 cm)
M2 I 5/9	Metham sodium at 184 l injected between rows of a pair as above
T1 I 5/9	'Telone II' at 92 l injected between rows of a pair as above
T2 I 5/9	'Telone II' at 184 l injected between rows of a pair as above
- I 7	No chemicals, injector tines only, - rows 7 inches (18 cm) apart
- - 7	No chemicals, no tines, rows 7 inches (18 cm) apart
- I 5/9	No chemicals, injector tines only between rows of a pair as above
- - 5/9	No chemicals, no tines, rows of a pair as above.

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Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 340 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l in 220 l). Fungicide: Triadimefon at 0.11 kg in 220 l.

Seed: Flanders, sown at 200 kg.

Cultivations, etc.:- Subsoiled, tines 60 cm deep, 140 cm apart: 13 Sept, 1979. Deep-tine cultivated twice: 19 Sept. Rotary cultivated: 5 Oct. Treatments applied: 17-18 Oct. Seed sown: 19 Oct. Weedkillers applied: 26 Mar, 1980. Fungicide applied: 3 June. Combine harvested: 26 Aug. Previous crops: S. barley 1978, s. beans 1979.

NOTE: Soil samples were taken before treatments were applied and after harvest for counts of migratory nematodes.

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80/W/WW/4

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	
OX1 CD 7	5.52
OX2 CD 7	5.75
OX4 CD 7	5.72
OX6 CD 7	5.77
AL1 CD 7	5.49
AL2 CD 7	5.78
AL4 CD 7	5.95
AL6 CD 7	5.90
AL2 BC 7	5.90
AL4 BC 7	5.93
AL8 BC 7	5.95
AL1 SB 7	5.57
AL2 SB 7	5.59
AL4 SB 7	5.39
M1 I 7	5.37
M2 I 7	5.63
T1 I 7	5.88
T2 I 7	5.86
M1 I 5/9	5.14
M2 I 5/9	5.33
T1 I 5/9	5.67
T2 I 5/9	5.88
- I 7	5.22
- - 7	5.56
- I 5/9	5.13
- - 5/9	5.29
MEAN	5.62

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT
SED	0.228

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	50	0.279	5.0

GRAIN MEAN DM% 85.1

PLOT AREA HARVESTED 0.00116

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80/R/WW/5

WINTER WHEAT

INTEGRATED PEST CONTROL

Object: To study the effects of chemical and biological treatments on the incidence of pests and beneficial insects and on the yield of w. wheat - Stackyard.

Sponsors: W. Powell, R. Bardner, C.A. Edwards, G.J.W. Dean, A. Dewar, N. Wilding, J.R. Lofty, K.E. Fletcher, R.T. Plumb.

Design: 3 randomised blocks of 5 plots.

Whole plot dimensions: 19.2 x 13.7

Treatments:

TREATMNT	Chemical and biological treatments:
NONE	None
BENOMYL	Benomylat 0.56 kg in 360 l on 8 May, 1980
DIMETHOA	Dimethoate at 0.34 l in 600 l on 11 June
PIRIMICA	Pirimicarb at 0.14 kg in 600 l on 11 June
ENTOMOPH	Biological control of aphids by the release of 86 Metopolophium dirhodum per square metre on 11 June and 15 Sitobion avenae per square metre on 12 June, both species infected with Entomophthora aphidis.

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 560 kg. Weedkillers: Isoproturon at 2.1 kg with mecoprop at 2.5 l in 220 l.

Seed: Flanders, not dressed insecticide, sown at 200 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 23 Aug, 1979. Ploughed: 13 Sept. Rotary harrowed: 4 Oct. Seed sown: 6 Oct. Weedkillers applied: 29 Feb, 1980. N applied: 8 Apr. Combine harvested: 20 Aug. Previous crops: S. wheat 1978, w. oats 1979.

NOTE: Ground surface insects were counted weekly between April and August and aerial insects weekly between May and July. Soil insects were counted in June. Aphid numbers, infection with Entomophthora and aphid parasite numbers were assessed in June and July.

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80/R/WW/5

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	NONE	BENOMYL	DIMETHOA	PIRIMICA	ENTOMOPH	MEAN
	8.24	8.53	8.54	8.61	7.89	8.36

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT
SED	0.193

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	8	0.237	2.8

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00293

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80/R/WW/6

WINTER WHEAT

WEEDKILLERS AND PESTS

Object: To study the effects of times of applying weedkillers on the incidence of pests and beneficial insects and on the yield of w. wheat - Stackyard.

Sponsors: W. Powell, R. Bardner, C.A. Edwards, G.J.W. Dean, A. Dewar, N. Wilding, J.R. Lofty, K.E. Fletcher, R.T. Plumb.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 19.2 x 19.2.

Treatments:

WEEDKLLR	Times of applying weedkillers:
NONE	None
AUTUMN	Chlortoluron at 5.6 l in 880 l on 2 Nov, 1979
SPRING	Isoproturon at 2.1 kg plus mecoprop at 2.5 l in 220 l on 29 Feb, 1980
AUT+SPNG	Chlortoluron plus isoproturon plus mecoprop at above rates and times

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 560 kg.

Seed: Flanders, not dressed insecticide, sown at 200 kg.

Cultivations, etc.:- Ploughed: 13 Sept, 1979. Rotary harrowed: 4 Oct. Seed sown: 6 Oct. N applied: 8 Apr, 1980. Combine harvested: 20 Aug. Previous crops: S. oats 1978, w. wheat 1979.

NOTE: Ground surface insects were counted weekly between April and August and aerial insects between May and July. Soil insects were counted in June. Aphid numbers and infection with Entomophthora were assessed in June and July. Weed species were identified and counted and percentage ground cover was assessed.

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

WEEDKLLR	NONE	AUTUMN	SPRING	AUT+SPNG	MEAN
	7.42	8.07	8.23	8.25	8.00

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	WEEDKLLR
SED	0.219

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.268	3.3

GRAIN MEAN DM% 84.2

PLOT AREA HARVESTED 0.00410

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80/R/WW/7

WINTER WHEAT

FUNGICIDES AND SOIL-BORNE DISEASES

Object: To study the effects of a range of soil-applied fungicides on soil-borne diseases and yield of w. wheat - Claycroft.

Sponsor: G.L. Bateman.

Design: 4 randomised blocks of 7 plots.

Whole plot dimensions: 2.13 x 12.2.

Treatments:

FUNGCIDE	Fungicides and times and methods of application:
NONE	None (duplicated)
BEN A	Benomyl at 20 kg, worked in to seedbed in autumn
BEN S	Benomyl at 20 kg, as a drench in 5400 l in spring
CHL A	Chloroneb at 14 kg, worked in to seedbed in autumn
KWG A+S	'KWG 0599' at 23 kg a.i. worked in to seedbed in autumn, repeated as a drench in 5400 l in spring
NUA A+S	Nuarimol at 4.4 kg, worked in to seedbed in autumn, repeated as a drench in 5400 l in spring

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-Chalk' at 560 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Mecoprop at 2.5 l in 280 l.

Seed: Flanders, no seed dressing, sown at 190 kg.

Cultivations, etc.:- Heavy spring-tine cultivated twice: 20 Sept, 1979. Heavy spring-tine cultivated: 4 Oct. Autumn treatments applied: 11 Oct. Paraquat applied: 16 Oct. Seed sown: 18 Oct. N applied: 11 Apr, 1980. Mecoprop applied: 16 Apr. Spring treatments applied: 24 Apr. Combine harvested: 21 Aug. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Foot and root diseases were assessed monthly between April and July.

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80/R/WW/7

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	BEN A	BEN S	CHL A	KWG A+S	NUA A+S	MEAN
	9.47	9.60	9.78	9.42	9.75	8.65	9.45

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	FUNGCIDE	
SED	0.207	MIN REP
	0.179	MAX-MIN

FUNGCIDE
MAX-MIN NONE V ANY OF REMAINDER
MIN REP ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	19	0.292	3.1

GRAIN MEAN DM% 83.4

PLOT AREA HARVESTED 0.00176

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80/R/WW/8

WINTER WHEAT

PREDATORS AND POLYTHENE BARRIERS

Object: To study the effects of polythene barriers on the incidence of mobile insect predators and on the yield of w. wheat - Summerdells II.

Sponsors: R. Bardner, W. Powell, K.E. Fletcher, J.R. Lofty.

Design: 3 randomised blocks of 4 plots.

Whole plot dimensions: 19.2 x 19.2.

Treatments: All combinations of:-

1. BARRIER — Polythene barriers, 38 cm above and 15 cm below soil surface from 16 Apr, 1980 until harvest:

   NONE — None
   POLYTHEN — Polythene barriers

2. INSCTCDE — Insecticide applied to soil surface on 21 Apr:

   NONE — None
   FONOFOS — Fonofos at 4.48 kg

Basal applications: Manures: (0:20:20) at 310 kg, combine drilled. 'Nitro-Chalk' at 500 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l. Isoproturon at 1.8 kg in 250 l.

Seed: Flanders, sown at 200 kg.

Cultivations, etc.:- Ploughed: 8 Oct, 1979. Rotary harrowed, seed sown: 15 Oct. N applied: 9 Apr, 1980. 'Brittox' applied: 14 Apr. Isoproturon applied: 15 Apr. Combine harvested: 23 Aug. Previous crops: S. barley 1978, s. beans 1979.

NOTE: Ground beetles were counted throughout the season, wheat blossom midges were counted on three occasions, aphids twice, and shoot borers once.

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE BARRIER	NONE	FONOFOS	MEAN
NONE	8.49	8.81	8.65
POLYTHEN	8.40	8.90	8.65
MEAN	8.45	8.85	8.65

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	BARRIER	INSCTCDE	BARRIER INSCTCDE
	0.076	0.076	0.108

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.132	1.5

GRAIN MEAN DM% 85.5

PLOT AREA HARVESTED 0.00546

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80/S/WW/1

WINTER WHEAT

FACTORS AFFECTING YIELD

Object: To study the effects of a range of factors on the incidence of pests and diseases and on the yield of w. wheat - Saxmundham.

Sponsors: F.V. Widdowson, A. Penny.

Design: Two blocks each a half replicate of 2 x 2 x 2 x 4 x 2 arranged as 8 whole plots split into 4.

Whole plot dimensions: 7.3 x 11.0.

Treatments: Combinations of:-

Blocks

1. PREVCROP — Previous cropping in 1979:

   BEANS
   WHEAT

Whole plots

2. SOW DATE — Dates of sowing:

   26 SEPT — 26 Sept, 1979
   16 OCT — 16 Oct

3. SDBED N — Nitrogen fertiliser (kg N) to seedbed:

   0
   50

4. PATHCONT — Pest and pathogen control:

   NONE
   FULL

Sub plots

5. S N RATE — Nitrogen fertiliser (kg N) total in spring:

   0
   80
   120
   160

6. S N TIME — Times of applying spring nitrogen fertiliser:

   FEB+MAR — 40 kg of total on 12 Feb, 1980, remainder on 31 Mar
   MAR — All on 31 Mar

NOTES: (1) SDBED N 50 was applied as (15:15:15). Plots not given this treatment received equivalent P & K as (0:20:20)

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(2) Full pest and pathogen control was:
Fungicides: Benomyl at 0.28 kg in 280 l on 10 Apr, 1980. Carbendazim with maneb and tridemorph (as 'Cosmic' at 3.9 kg) plus captafol at 1.1 kg in 280 l applied alone on 14 May and with dimethoate on 18 June. Carbendazim at 0.25 kg, maneb at 1.6 kg, captafol at 1.1 kg in 280 l applied with pirimicarb on 8 July.
Insecticides: Dimethoate at 0.34 l. Pirimicarb at 0.14 kg.

Basal applications: Weedkillers: Chlortoluron at 5.6 kg in 220 l. Ioxynil at 0.63 kg and mecoprop at 1.9 kg in 220 l.

Seed: Virtue, sown at 180 kg.

Cultivations, etc.:- Chlortoluron applied: 17 Oct, 1979. Ioxynil and mecoprop applied: 31 Mar, 1980. Combine harvested: 20 Aug.

NOTE: N content of grain was measured. Yields of straw were recorded only for PREVCROP BEANS.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SOW DATE	26 SEPT	16 OCT	MEAN
PREVCROP			
BEANS	8.29	8.29	8.29
WHEAT	7.71	7.50	7.60
MEAN	8.00	7.89	7.95

SDBED N	0	50	MEAN
PREVCROP			
BEANS	7.95	8.64	8.29
WHEAT	7.24	7.97	7.60
MEAN	7.59	8.30	7.95

SDBED N	0	50	MEAN
SOW DATE			
26 SEPT	7.63	8.38	8.00
16 OCT	7.56	8.23	7.89
MEAN	7.59	8.30	7.95

PATHCONT	NONE	FULL	MEAN
PREVCROP			
BEANS	7.84	8.74	8.29
WHEAT	6.99	8.21	7.60
MEAN	7.42	8.48	7.95

PATHCONT	NONE	FULL	MEAN
SOW DATE			
26 SEPT	7.46	8.55	8.00
16 OCT	7.38	8.41	7.89
MEAN	7.42	8.48	7.95

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PATHCONT SDBED N	NONE	FULL	MEAN
0	7.20	7.98	7.59
50	7.63	8.97	8.30
MEAN	7.42	8.48	7.95

S N RATE PREVCROP	0	80	120	160	MEAN
BEANS	6.13	8.51	8.96	9.57	8.29
WHEAT	5.23	7.70	8.48	9.01	7.60
MEAN	5.68	8.11	8.72	9.29	7.95

S N RATE SOW DATE	0	80	120	160	MEAN
26 SEPT	5.65	8.24	8.83	9.30	8.00
16 OCT	5.71	7.97	8.62	9.28	7.89
MEAN	5.68	8.11	8.72	9.29	7.95

S N RATE SDBED N	0	80	120	160	MEAN
0	5.08	7.69	8.35	9.26	7.59
50	6.28	8.52	9.10	9.32	8.30
MEAN	5.68	8.11	8.72	9.29	7.95

S N RATE PATHCONT	0	80	120	160	MEAN
NONE	5.23	7.52	8.25	8.68	7.42
FULL	6.13	8.69	9.19	9.90	8.48
MEAN	5.68	8.11	8.72	9.29	7.95

S N TIME PREVCROP	FEB+MAR	MAR	MEAN
BEANS	8.22	8.37	8.29
WHEAT	7.62	7.59	7.60
MEAN	7.92	7.98	7.95

S N TIME SOW DATE	FEB+MAR	MAR	MEAN
26 SEPT	7.90	8.11	8.00
16 OCT	7.94	7.85	7.89
MEAN	7.92	7.98	7.95

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

S N TIME SDBED N	FEB+MAR	MAR	MEAN
0	7.53	7.65	7.59
50	8.30	8.31	8.30
MEAN	7.92	7.98	7.95

S N TIME PATHCONT	FEB+MAR	MAR	MEAN
NONE	7.40	7.44	7.42
FULL	8.44	8.52	8.48
MEAN	7.92	7.98	7.95

S N TIME S N RATE	FEB+MAR	MAR	MEAN
0	5.68	5.68	5.68
80	8.06	8.15	8.11
120	8.61	8.83	8.72
160	9.32	9.25	9.29
MEAN	7.92	7.98	7.95

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SOW DATE	SDBED N	PATHCONT
SED	0.083	0.083	0.083

TABLE	S N RATE	S N TIME	PREVCROP* SOW DATE	PREVCROP* SDBED N
SED	0.112	0.079	0.117	0.117

TABLE	SOW DATE SDBED N	PREVCROP* PATHCONT	SOW DATE PATHCONT	SDBED N PATHCONT
SED	0.117	0.117	0.117	0.117

TABLE	PREVCROP* S N RATE	SOW DATE S N RATE	SDBED N S N RATE	PATHCONT S N RATE
SED	0.159	0.161	0.161	0.161
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
PREVCROP	0.159			
SOW DATE		0.159		
SDBED N			0.159	
PATHCONT				0.159

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GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PREVCROP* S N TIME	SOW DATE S N TIME	SDBED N S N TIME	PATHCONT S N TIME
SED	0.112	0.115	0.115	0.115
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:				
SOW DATE		0.112		
SDBED N			0.112	
PATHCONT				0.112

TABLE	S N RATE S N TIME
SED	0.159
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:	
S N RATE	0.161

* WITHIN THE SAME LEVEL OF PREVCROP ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	4	0.165	2.1
BLOCK.WP.SP	26	0.318	4.0

GRAIN MEAN DM% 85.1

STRAW DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

SDBED N	0	50	MEAN
SOW DATE			
26 SEPT	3.57	3.86	3.71
16 OCT	3.66	3.27	3.46
MEAN	3.61	3.57	3.59

PATHCONT	NONE	FULL	MEAN
SOW DATE			
26 SEPT	3.54	3.89	3.71
16 OCT	3.79	3.13	3.46
MEAN	3.66	3.51	3.59

PATHCONT	NONE	FULL	MEAN
SDBED N			
0	3.69	3.53	3.61
50	3.64	3.50	3.57
MEAN	3.66	3.51	3.59

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80/S/WW/1

STRAW DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

S N RATE	0	80	120	160	MEAN
SOW DATE					
26 SEPT	2.01	4.17	4.52	4.16	3.71
16 OCT	2.19	3.24	3.92	4.50	3.46
MEAN	2.10	3.70	4.22	4.33	3.59

S N RATE	0	80	120	160	MEAN
SDBED N					
0	1.99	3.72	4.31	4.43	3.61
50	2.21	3.69	4.14	4.23	3.57
MEAN	2.10	3.70	4.22	4.33	3.59

S N RATE	0	80	120	160	MEAN
PATHCONT					
NONE	2.57	3.71	4.20	4.19	3.66
FULL	1.64	3.70	4.24	4.47	3.51
MEAN	2.10	3.70	4.22	4.33	3.59

S N TIME	FEB+MAR	MAR	MEAN
SOW DATE			
26 SEPT	3.62	3.81	3.71
16 OCT	3.38	3.55	3.46
MEAN	3.50	3.68	3.59

S N TIME	FEB+MAR	MAR	MEAN
SDBED N			
0	3.52	3.70	3.61
50	3.48	3.66	3.57
MEAN	3.50	3.68	3.59

S N TIME	FEB+MAR	MAR	MEAN
PATHCONT			
NONE	3.57	3.76	3.66
FULL	3.42	3.60	3.51
MEAN	3.50	3.68	3.59

S N TIME	FEB+MAR	MAR	MEAN
S N RATE			
0	2.18	2.02	2.10
80	3.66	3.75	3.70
120	4.09	4.35	4.22
160	4.06	4.59	4.33
MEAN	3.50	3.68	3.59

STRAW MEAN DM% 75.6

SUB PLOT AREA HARVESTED 0.00111

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80/R/WS/1

SPRING WHEAT

FUNGICIDES AND ALTERNARIA

Object: To study the effects of a range of fungicides, and times of application, on the incidence of fungi, especially Alternaria, on the ripening grain and on the yield of s. wheat - Delafield.

Sponsor: N. Magan.

Design: 2 randomised blocks of 24 plots.

Whole plot dimensions: 4.27 x 16.2.

Treatments: All combinations of:-

1. E FUNG — Early-applied fungicide:

NONE	None
CARB+MAN	Carbendazim at 0.25 kg plus maneb at 1.6 kg applied on 9 June 1980

2. L FUNG — Late-applied fungicide:

BENOMYL	Benomyl at 0.56 kg
PROCHLOR	Prochloraz at 0.50 kg
CAPTAFOL	Captafol at 1.40 kg
CARB+MAN	Carbendazim at 0.25 kg plus maneb at 1.6 kg
IMAZALIL	Imazalil at 0.5 kg

3. LFNGDATE — Dates of applying late fungicide:

25 JUNE
7 JULY

plus two extra treatments not given L FUNG:

L FNG 0

NONE	No early-applied fungicide (duplicated)
CARB+MAN	Carbendazim at 0.25 kg plus maneb at 1.6 kg applied on 9 June (duplicated)

NOTE: Treatment sprays were applied in 340 l.

Basal applications: Manures: (20:10:10) at 450 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 5.0 l) in 250 l.

Seed: Timmo, sown at 190 kg.

Cultivations, etc.:- Subsoiled with tines 160 cm apart and 40 cm deep: 2 Nov, 1979. Chisel ploughed twice: 4 Dec. Spring-tine cultivated, seed sown: 6 Apr, 1980. Weedkillers applied: 27 May. Combine harvested: 4 Sept. Previous crops: S. beans and kale 1978, potatoes 1979.

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NOTES: Grain microflora, especially Alternaria, were assessed at fortnightly intervals after heading. Thousand grain weights were measured, and grain was assessed for germination and seedling growth.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

L FUNG / E FUNG	BENOMYL	PROCHLOR	CAPTAFOL	CARB+MAN	IMAZALIL	MEAN
NONE	4.33	4.51	4.51	4.50	4.14	4.40
CARB+MAN	4.86	4.75	4.72	4.50	4.83	4.73
MEAN	4.59	4.63	4.62	4.50	4.48	4.56

LFNGDATE / E FUNG	25 JUNE	7 JULY	MEAN
NONE	4.39	4.40	4.40
CARB+MAN	4.78	4.68	4.73
MEAN	4.59	4.54	4.56

LFNGDATE / L FUNG	25 JUNE	7 JULY	MEAN
BENOMYL	4.77	4.41	4.59
PROCHLOR	4.56	4.70	4.63
CAPTAFOL	4.60	4.64	4.62
CARB+MAN	4.56	4.43	4.50
IMAZALIL	4.44	4.53	4.48
MEAN	4.59	4.54	4.56

E FUNG	LFNGDATE / L FUNG	25 JUNE	7 JULY
NONE	BENOMYL	4.37	4.28
	PROCHLOR	4.32	4.70
	CAPTAFOL	4.50	4.52
	CARB+MAN	4.56	4.44
	IMAZALIL	4.22	4.07
CARB+MAN	BENOMYL	5.18	4.54
	PROCHLOR	4.80	4.70
	CAPTAFOL	4.69	4.75
	CARB+MAN	4.57	4.42
	IMAZALIL	4.66	5.00

L FUNG 0	NONE	CARB+MAN	MEAN
	4.44	4.92	4.68

GRAND MEAN 4.58

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80/R/WS/1

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	L FNG 0	E FUNG	L FUNG	LFNGDATE
SED	0.285	0.127	0.202	0.127

TABLE	E FUNG L FUNG	E FUNG LFNGDATE	L FUNG LFNGDATE	E FUNG L FUNG LFNGDATE
SED	0.285	0.180	0.285	0.403

SED FOR COMPARING A MEAN IN E FUNG.L FUNG.LFNGDATE TABLE WITH A L FNG 0 MEAN IS 0.247

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	25	0.403	8.8

GRAIN MEAN DM% 79.1

PLOT AREA HARVESTED 0.00260

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80/R/B/1

WINTER BARLEY

RHYNCHOSPORIUM CONTROL IN A SERIALLY BALANCED DESIGN

Object: To study the effects of interference between plots of w. barley with different amounts of Rhynchosporium secalis - Gt. Knott III.

Sponsors: J.F. Jenkyn, A. Bainbridge, G.V. Dyke.

Design: 2 lines of 38 plots each. Each line is a serially balanced sequence such that each of 4 treatments has as neighbours all ordered pairs of the other 3 treatments, once each.

Whole plot dimensions: 3.9 x 9.14.

Treatments:

TREATMNT	Treatment with infected straw and times of applying fungicide:
0 INFSTR	No fungicide against R. secalis. Infected straw worked in to seedbed
CAPT A	Captafol in autumn
CAPT S	Captafol in spring
CAPT A+S	Captafol in autumn and in spring

NOTES: (1) The effects of treatments to neighbouring plots (left - LHN, right - RHN) are estimated. In this experiment 'left' was South, 'right' was North. The analysis presented assumes a Fourier curve with 4 terms, 2 sine and 2 cosine to represent positional variation.

(2) The area surrounding this experiment was sown with the Rhynchosporium resistant variety Athene at 160 kg on 18 Oct, 1979.

(3) Straw was applied (at 645 kg) to '0 INFSTR' plots on 17 Oct, 1979.
Captafol was applied at 1.34 kg in 340 l on 31 Dec and 10 Apr, 1980.

Basal applications: Manures: (10:23:23) at 250 kg, combine drilled. 'Nitro-chalk' at 540 kg. Weedkillers: Paraquat at 0.56 kg ion in 220 l. Methabenzthiazuron at 1.6 kg in 220 l. Fungicide: Ethirimol (as 'Milgo E' at 1.3 l) in 220 l.

Seed: Maris Otter, sown at 160 kg.

Cultivations, etc.:- Heavy spring-tine cultivated: 25 Sept, 1979. Paraquat applied: 15 Oct. Power harrowed: 17 Oct. Seed sown: 18 Oct. Methabenzthiazuron applied: 20 Oct. Fungicide applied: 5 Apr, 1980. N applied: 9 Apr. Combine harvested: 31 July. Previous crops: S. barley 1978, w. oats 1979.

NOTE: Leaf diseases were assessed during the season, and 1000 grain weights after harvest.

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80/R/B/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	0 INFSTR	CAPT A	CAPT S	CAPT A+S
	6.46	6.73	6.91	6.79

LHN / TREATMNT	0 INFSTR	CAPT A	CAPT S	CAPT A+S
0 INFSTR		6.43	6.52	6.41
CAPT A	6.82		6.56	6.80
CAPT S	7.07	6.95		6.71
CAPT A+S	7.05	6.57	6.76	

RHN / TREATMNT	0 INFSTR	CAPT A	CAPT S	CAPT A+S
0 INFSTR		6.55	6.50	6.33
CAPT A	6.86		6.69	6.63
CAPT S	6.92	6.90		6.91
CAPT A+S	7.02	6.81	6.54	

TREATMNT	RHN / LHN	0 INFSTR	CAPT A	CAPT S	CAPT A+S
0 INFSTR	CAPT A		6.19	6.64	6.46
0 INFSTR	CAPT S		6.68	6.34	6.55
0 INFSTR	CAPT A+S		6.77	6.50	5.97
CAPT A	0 INFSTR	6.92		6.99	6.55
CAPT A	CAPT S	6.72		6.71	6.25
CAPT A	CAPT A+S	6.93		6.39	7.08
CAPT S	0 INFSTR	7.46	7.03		6.71
CAPT S	CAPT A	6.68	6.96		7.23
CAPT S	CAPT A+S	6.62	6.72		6.78
CAPT A+S	0 INFSTR	7.49	7.09	6.57	
CAPT A+S	CAPT A	6.72	6.67	6.31	
CAPT A+S	CAPT S	6.86	6.68	6.73	

GRAND MEAN 6.72

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT	TREATMNT LHN	TREATMNT RHN	TREATMNT LHN RHN
SED	0.120	0.220	0.220	0.389

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
LINE.WP	31	0.356	5.3

GRAIN MEAN DM% 77.8

PLOT AREA HARVESTED 0.00195

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80/W/B/1

WINTER & SPRING BARLEY

MILDEW SENSITIVITY TO ETHIRIMOL

Object: To study the effects of dressing barley seed with ethirimol on the subsequent sensitivity of mildew and on the yield of w. and s. barley - White Horse.

Sponsor: D.W. Hollomon.

Design: W. barley: 4 blocks of 4 plots split into 2
S. barley: 4 blocks of 4 plots

Whole plot dimensions: 8.53 x 8.53.

Treatments:

To WINTER BARLEY All combinations of:-

Whole plots

1. SEEDRESS		Seed dressing to w. barley:
	WO	None
	WE	Ethirimol
2. FUNG SB		Fungicide applied to adjacent plots of s. barley:
	S OT	No fungicides to one adjacent plot, tridemorph to the other adjacent plot
	S ET	Ethirimol seed dressing to one adjacent plot, tridemorph to the other adjacent plot

Sub plots

3. POSITION		Position of w. barley plots in relation to s. barley plots testing seed dressing (S O & S E below):
	N WEST	North west
	S EAST	South east

To SPRING BARLEY All combinations of:-

1. SEEDRESS		Seed dressing to s. barley:
	SO	None
	SE	Ethirimol
2. FUNG WB		Fungicide applied to both adjacent plots of w. barley:
	W O	None
	W E	Ethirimol seed dressing

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80/W/B/1

NOTES: (1) Plot dimensions were 8.53 x 8.53 and plots were arranged in sets of three - a central s. barley plot with flanking plots of w. barley. Sides of sets of three plots were separated by 'plots' of s. barley of the same dimensions sprayed with tridemorph, ends of plots were separated by strips of s. barley 9.14 wide sprayed with tridemorph.
(2) Tridemorph was applied at 0.53 kg in 280 l.

Basal applications: Manures: (10:23:23) at 260 kg, combine drilled for w. barley, 'Nitro-Chalk' at 380 kg to all plots, (0:20:20) at 280 kg, combine drilled for s. barley, additional 'Nitro-Chalk' at 180 kg to w. barley. Weedkillers: Mecoprop at 2.5 l with isoproturon at 1.5 kg in 280 l to w. barley. Mecoprop, bromoxynil, and ioxynil ('Brittox' at 3.5 l in 280 l) to s. barley.

Seed: W. barley, Hoppel sown at 170 kg.
S. barley, Wing sown at 160 kg.

Cultivations, etc.:- Deep-tine cultivated: 18 Sept, 1979, 19 Sept. Rotary cultivated: 25 Sept, 4 Oct. W. barley sown : 5 Oct. Heavy spring-tine cultivated for spring sowing: 18 Feb, 1980, 24 Mar. Mecoprop with isoproturon applied to w. barley: 19 Feb. N applied to all plots: 25 Mar. Spring-tine cultivated with crumbler attached, s. barley sown: 26 Mar. N applied to w. barley: 8 Apr. 'Brittox' applied to s. barley: 8 May. Tridemorph applied: 19 May. W. barley combine harvested: 1 Aug. S. barley combine harvested: 21 Aug. Previous crops: W. oats 1978, w. wheat 1979.

NOTE: The incidence of mildew (Erysiphe graminis) was measured during November and April for w. barley and during May and June for s. barley.

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80/W/B/1

WINTER BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNG SB	S OT	S ET	MEAN
SEEDRESS			
WO	5.09	4.90	4.99
WE	4.72	5.00	4.86
MEAN	4.90	4.95	4.93

POSITION	N WEST	S EAST	MEAN
SEEDRESS			
WO	4.94	5.05	4.99
WE	4.99	4.73	4.86
MEAN	4.96	4.89	4.93

POSITION	N WEST	S EAST	MEAN
FUNG SB			
S OT	5.09	4.71	4.90
S ET	4.84	5.06	4.95
MEAN	4.96	4.89	4.93

FUNG SB	S OT		S ET	
POSITION	N WEST	S EAST	N WEST	S EAST
SEEDRESS				
WO	5.14	5.03	4.74	5.06
WE	5.05	4.39	4.94	5.06

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEEDRESS	FUNG SB	POSITION	SEEDRESS FUNG SB
SED	0.364	0.364	0.162	0.514

TABLE	SEEDRESS POSITION	FUNG SB POSITION	SEEDRESS FUNG SB POSITION
SED	0.398	0.398	0.563
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
SEEDRESS	0.229		
FUNG SB		0.229	
SEEDRESS.FUNG SB			0.324

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.727	14.8
BLOCK.WP.SP	12	0.458	9.3

GRAIN MEAN DM% 83.2 SUB PLOT AREA HARVESTED 0.00243

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80/W/B/1

SPRING BARLEY

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNG WB / SEEDRESS	W 0	W E	MEAN
S0	4.78	4.83	4.80
SE	5.41	5.02	5.22
MEAN	5.09	4.93	5.01

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEEDRESS	FUNG WB	SEEDRESS FUNG WB
SED	0.195	0.195	0.276

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	9	0.391	7.8

GRAIN MEAN DM% 82.4

PLOT AREA HARVESTED 0.00243

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80/R/B/2

WINTER BARLEY

SOWING DATES AND PATHOGEN CONTROL

Object: To study the effects of times of applying fungicides and aphicide on the incidence of mildew, aphids and barley yellow dwarf virus and on the yield of w. barley - Gt. Knott I.

Sponsors: A. Bainbridge, M.E. Finney, J.F. Jenkyn, R.T. Plumb.

Design: 2 randomised blocks of 28 plots.

Whole plot dimensions: 2.13 x 6.10.

Treatments: All combinations of:-

1. SOW DATE	Dates of sowing:	
	14 SEP	14 September
	9 OCT	9 October
2. MILCON E	Mildew control early date:	
	NONE	None
	ETHIRIMO	Ethirimol seed dressing
	TRIDEMOR	Tridemorph spray 14 SEP plots on 24 Oct, 1979 9 OCT plots on 13 Nov
3. MILCON M	Mildew control mid date:	
	NONE	None
	TRIDEMOR	Tridemorph spray 11 Apr, 1980
4. MILCON L	Mildew control late date:	
	NONE	None
	TRIDEMOR	Tridemorph spray 19 May

plus four extra treatments given ethirimol seed dressing and tridemorph sprays on 11 Apr and 19 May:

INSCTCDE	
NONE	None
DEMETON	Demeton-s-methyl on 19 May

taken in all combinations with SOW DATE above

NOTES: (1) A planned test of demeton-s-methyl in November was not done because of inclement weather and very few aphids.
(2) Sprays of tridemorph were applied at 0.53 kg in 340 l, and demeton-s-methyl at 0.24 l in 340 l.

Basal applications: Manures: (0:14:28) at 360 kg. 'Nitro-Chalk' at 390 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 250 l.

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Seed: Hoppel, sown at 160 kg.

Cultivations, etc.:- PK applied, heavy spring-tine cultivated twice: 13 Sept, 1979. Spring-tine cultivated for the first sowing: 14 Sept. Spring-tine cultivated for the second sowing: 9 Oct. Weedkillers applied: 7 Apr. N applied: 9 Apr. Combine harvested: 30 July: Previous crops: S beans 1978, potatoes 1979.

NOTE: Emergence counts were made early in the season. Diseases including viruses were assessed on six occasions. Numbers of stems and grains per ear were counted at maturity and 1000 grain weights were measured.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

MILCON E	NONE	ETHIRIMO	TRIDEMOR	MEAN
SOW DATE				
14 SEP	11.06	10.85	11.08	11.00
9 OCT	9.36	9.21	9.50	9.36
MEAN	10.21	10.03	10.29	10.18

MILCON M	NONE	TRIDEMOR	MEAN
SOW DATE			
14 SEP	10.80	11.20	11.00
9 OCT	8.94	9.78	9.36
MEAN	9.87	10.49	10.18

MILCON M	NONE	TRIDEMOR	MEAN
MILCON E			
NONE	9.66	10.77	10.21
ETHIRIMO	10.09	9.98	10.03
TRIDEMOR	9.87	10.71	10.29
MEAN	9.87	10.49	10.18

MILCON L	NONE	TRIDEMOR	MEAN
SOW DATE			
14 SEP	11.07	10.92	11.00
9 OCT	9.44	9.28	9.36
MEAN	10.26	10.10	10.18

MILCON L	NONE	TRIDEMOR	MEAN
MILCON E			
NONE	10.25	10.18	10.21
ETHIRIMO	10.22	9.85	10.03
TRIDEMOR	10.31	10.27	10.29
MEAN	10.26	10.10	10.18

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

MILCON L	NONE	TRIDEMOR	MEAN
MILCON M			
NONE	9.87	9.87	9.87
TRIDEMOR	10.64	10.33	10.49
MEAN	10.26	10.10	10.18

MILCON E	NONE		ETHIRIMO		TRIDEMOR	
MILCON M	NONE	TRIDEMOR	NONE	TRIDEMOR	NONE	TRIDEMOR
SOW DATE						
14 SEP	10.81	11.32	10.92	10.79	10.67	11.49
9 OCT	8.51	10.22	9.26	9.17	9.06	9.94

MILCON E	NONE		ETHIRIMO		TRIDEMOR	
MILCON L	NONE	TRIDEMOR	NONE	TRIDEMOR	NONE	TRIDEMOR
SOW DATE						
14 SEP	11.14	10.99	11.01	10.70	11.07	11.09
9 OCT	9.35	9.38	9.43	9.00	9.54	9.46

MILCON M	NONE		TRIDEMOR	
MILCON L	NONE	TRIDEMOR	NONE	TRIDEMOR
SOW DATE				
14 SEP	10.91	10.69	11.24	11.15
9 OCT	8.83	9.06	10.05	9.50

MILCON M	NONE		TRIDEMOR	
MILCON L	NONE	TRIDEMOR	NONE	TRIDEMOR
MFLCON E				
NONE	9.61	9.71	10.89	10.65
ETHIRIMO	10.23	9.95	10.20	9.75
TRIDEMOR	9.77	9.96	10.84	10.58

	MILCON M	NONE		TRIDEMOR	
	MILCON L	NONE	TRIDEMOR	NONE	TRIDEMOR
SOW DATE	MILCON E				
14 SEP	NONE	11.24	10.39	11.05	11.59
	ETHIRIMO	10.95	10.89	11.06	10.51
	TRIDEMOR	10.53	10.81	11.61	11.36
9 OCT	NONE	7.97	9.04	10.72	9.72
	ETHIRIMO	9.51	9.01	9.34	8.99
	TRIDEMOR	9.01	9.11	10.07	9.80

INSCTCDE	NONE	DEMETON	MEAN
SOW DATE			
14 SEP	11.20	10.57	10.89
9 OCT	9.70	9.49	9.60
MEAN	10.45	10.03	10.24

GRAND MEAN 10.19

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GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	INSCTCDE	SOW DATE	MILCON E	MILCON M
SED	0.524	0.214 0.524*	0.262	0.214

TABLE	MILCON L	SOW DATE MILCON E	SOW DATE MILCON M	MILCON E MILCON M
SED	0.214	0.371	0.303	0.371

TABLE	SOW DATE MILCON L	MILCON E MILCON L	MILCON M MILCON L	SOW DATE INSCTCDE
SED	0.303	0.371	0.303	0.742

TABLE	SOW DATE MILCON E MILCON L	SOW DATE MILCON M MILCON L	MILCON E MILCON M MILCON L	SOW DATE MILCON E MILCON M
SED	0.524	0.428	0.524	0.524

TABLE	SOW DATE MILCON E MILCON M MILCON L
SED	0.742

* FOR MARGIN OF INSCTCDE.SOW DATE TABLE ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.742	7.3

GRAIN MEAN DM% 82.7

PLOT AREA HARVESTED 0.00130

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80/R/B/3

WINTER BARLEY

DATES OF SOWING, N AND GROWTH REGULATOR

Object: To study the effects of rates and times of nitrogen fertiliser for early and late sown w. barley, a growth regulator is also tested - Gt. Knott I N.

Sponsors: F.V. Widdowson, J.N. Gallagher, M.E. Finney.

Design: 2 randomised blocks of 25 plots.

Whole plot dimensions: 2.67 x 13.9.

Treatments: All combinations of:-

1.	SOWDATE	Dates of sowing:
	18 SEP	18 September, 1979
	16 OCT	16 October
2.	EN RATE	Rate of early nitrogen fertiliser (kg N):
	0	None
	35	35 on 25 January, 1980
3.	SN RATE	Rate of spring nitrogen fertiliser (kg N):
	75	
	110	
4.	SN TIME	Time of applying spring nitrogen fertiliser:
	E	Early, on 7 Mar, 1980
	L	Later, on 8 April
	EL	Dressing equally divided between above dates
5.	GRTH REG	Growth regulator:
	0	None
	MEP+ETH	Mepiquat chloride + ethephon as 'Terpal' at 2.46 l in 280 l

plus two extra treatments not given nitrogen fertiliser or growth regulator:

EXTRA	
18 SEP 0	Sown 18 September
16 OCT 0	Sown 16 October

NOTE: The growth regulator was applied at the recommended growth stage (Zadoks 3.1 - 3.2) which occurred on 22 April for the first sowing, and 7 May for the second.

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Basal applications: Manures: (0:14:28) at 360 kg. Weedkillers: Mecoprop, bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l. Fungicides: Tridemorph at 0.53 kg applied twice, with the weedkillers on the first occasion and with benodanil on the second. Benodanil at 1.1 kg in 200 l applied with a 'wetter' ('Cittowet' at 0.18 l).

Seed: Sonja, sown at 160 kg.

Cultivations, etc.:- PK applied, heavy spring-tine cultivated: 17 Sept, 1979. Spring-tine cultivated: 18 Sept. Weedkillers and tridemorph applied: 15 Apr, 1980. Tridemorph and benodanil applied: 15 May. Combine harvested: 30 July. Previous crops: S. beans 1978, potatoes 1979.

NOTE: Nitrate in the crop was measured three times during the season, and nitrate in the soil twice. Crop height and ear numbers were measured in June.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

EN RATE	0	35	MEAN
SOWDATE			
18 SEP	8.29	8.36	8.33
16 OCT	8.11	8.14	8.12
MEAN	8.20	8.25	8.22

SN RATE	75	110	MEAN
SOWDATE			
18 SEP	8.16	8.49	8.33
16 OCT	7.97	8.28	8.12
MEAN	8.06	8.39	8.22

SN RATE	75	110	MEAN
EN RATE			
0	8.05	8.34	8.20
35	8.07	8.43	8.25
MEAN	8.06	8.39	8.22

SN TIME	E	L	EL	MEAN
SOWDATE				
18 SEP	8.12	8.66	8.20	8.33
16 OCT	7.89	8.23	8.24	8.12
MEAN	8.01	8.45	8.22	8.22

SN TIME	E	L	EL	MEAN
EN RATE				
0	8.07	8.30	8.22	8.20
35	7.94	8.59	8.22	8.25
MEAN	8.01	8.45	8.22	8.22

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GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SN TIME	E	L	EL	MEAN
SN RATE				
75	7.91	8.23	8.06	8.06
110	8.11	8.66	8.39	8.39
MEAN	8.01	8.45	8.22	8.22

GRTH REG	0	MEP+ETH	MEAN
SOWDATE			
18 SEP	7.94	8.72	8.33
16 OCT	7.70	8.55	8.12
MEAN	7.82	8.63	8.22

GRTH REG	0	MEP+ETH	MEAN
EN RATE			
0	7.91	8.49	8.20
35	7.73	8.77	8.25
MEAN	7.82	8.63	8.22

GRTH REG	0	MEP+ETH	MEAN
SN RATE			
75	7.69	8.44	8.06
110	7.94	8.83	8.39
MEAN	7.82	8.63	8.22

GRTH REG	0	MEP+ETH	MEAN
SN TIME			
E	7.65	8.36	8.01
L	7.90	8.99	8.45
EL	7.90	8.55	8.22
MEAN	7.82	8.63	8.22

EN RATE	0		35	
SN RATE	75	110	75	110
SOWDATE				
18 SEP	8.17	8.41	8.15	8.57
16 OCT	7.94	8.27	7.99	8.28

EN RATE	0			35		
SN TIME	E	L	EL	E	L	EL
SOWDATE						
18 SEP	8.14	8.63	8.10	8.10	8.69	8.30
16 OCT	8.01	7.97	8.35	7.78	8.49	8.14

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80/R/B/3

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

SN RATE	75			110		
SN TIME	E	L	EL	E	L	EL
SOWDATE						
18 SEP	8.05	8.34	8.09	8.19	8.98	8.31
16 OCT	7.77	8.11	8.03	8.02	8.35	8.46

SN RATE	75			110		
SN TIME	E	L	EL	E	L	EL
EN RATE						
0	7.93	8.07	8.16	8.22	8.53	8.29
35	7.89	8.38	7.95	7.99	8.80	8.48

EN RATE	0		35	
GRTH REG	0	MEP+ETH	0	MEP+ETH
SOWDATE				
18 SEP	7.92	8.66	7.95	8.77
16 OCT	7.89	8.33	7.50	8.77

SN RATE	75		110	
GRTH REG	0	MEP+ETH	0	MEP+ETH
SOWDATE				
18 SEP	7.85	8.47	8.03	8.96
16 OCT	7.53	8.40	7.86	8.69

SN RATE	75		110	
GRTH REG	0	MEP+ETH	0	MEP+ETH
EN RATE				
0	7.94	8.17	7.88	8.81
35	7.45	8.70	8.01	8.85

SN TIME	E		L		EL	
GRTH REG	0	MEP+ETH	0	MEP+ETH	0	MEP+ETH
SOWDATE						
18 SEP	7.73	8.51	8.15	9.17	7.93	8.47
16 OCT	7.57	8.22	7.66	8.80	7.86	8.62

SN TIME	E		L		EL	
GRTH REG	0	MEP+ETH	0	MEP+ETH	0	MEP+ETH
EN RATE						
0	7.71	8.44	7.92	8.67	8.09	8.36
35	7.59	8.29	7.88	9.30	7.71	8.73

SN TIME	E		L		EL	
GRTH REG	0	MEP+ETH	0	MEP+ETH	0	MEP+ETH
SN RATE						
75	7.69	8.12	7.74	8.72	7.64	8.47
110	7.61	8.60	8.07	9.26	8.15	8.62

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80/R/B/3

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

EXTRA	18 SEP 0	16 OCT 0	MEAN
	6.88	5.81	6.35

GRAND MEAN 8.15

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SOWDATE	EN RATE	SN RATE	SN TIME
SED	0.142	0.142	0.142	0.174

TABLE	GRTH REG	SOWDATE EN RATE	SOWDATE SN RATE	EN RATE SN RATE
SED	0.142	0.201	0.201	0.201

TABLE	SOWDATE SN TIME	EN RATE SN TIME	SN RATE SN TIME	SOWDATE GRTH REG
SED	0.247	0.247	0.247	0.201

TABLE	EN RATE GRTH REG	SN RATE GRTH REG	SN TIME GRTH REG	SOWDATE EN RATE SN RATE
SED	0.201	0.201	0.247	0.285

TABLE	SOWDATE EN RATE SN TIME	SOWDATE SN RATE SN TIME	EN RATE SN RATE SN TIME	SOWDATE EN RATE GRTH REG
SED	0.349	0.349	0.349	0.285

TABLE	SOWDATE SN RATE GRTH REG	EN RATE SN RATE GRTH REG	SOWDATE SN TIME GRTH REG	EN RATE SN TIME GRTH REG
SED	0.285	0.285	0.349	0.349

TABLE	SN RATE SN TIME GRTH REG
SED	0.349

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.493	6.0

GRAIN MEAN DM% 81.8

PLOT AREA HARVESTED 0.00349

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80/R/B/7 and 80/W/B/7

SPRING BARLEY

VARIETIES, N AND APHICIDE

Object: To study the yields of some of the newer varieties of s. barley; an aphicide and three rates of nitrogen are also tested - Rothamsted (R) Whittlocks and Woburn (W) Butt Close.

Sponsor: R. Moffitt.

Design: 3 randomised blocks of 10 x 4 criss cross.

Whole plot dimensions: 4.27 x 27.1.

Treatments: All combinations of:-

Column plots

1. VARIETY — Varieties and variety mixtures:

ARKROYAL	Ark Royal
ATHOS	Athos
AT+TY+GE	Athos + Tyra + Georgie, one third of each
GEORGIE	Georgie
JUPITER	Jupiter
KEG	Keg
KORU	Koru
PORTHOS	Porthos
SIMON	Simon
TRIUMPH	Triumph

Row plots

2. N APH — Nitrogen fertiliser (kg N) and aphicide:

38	38
75	75
113	113
113+DMS	113 + demeton-s-methyl at 0.24 l in 250 l, Whittlocks (R): 11 July, in 300 l Butt Close (W): 7 July

Basal applications:
Whittlocks (R): Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.0 l in 250 l) applied with fungicide. Fungicide: Tridemorph at 0.53 kg.
Butt Close (W): Manures: (0:20:20) at 310 kg, combine drilled. Weedkillers: Mecoprop with bromoxynil and ioxynil ('Brittox' at 3.5 l in 280 l). Fungicide: Ethirimol ('Milgo E' at 1.3 l in 280 l).

Seed: Whittlocks (R): Varieties sown at 160 kg.
Butt Close (W): Varieties sown at 160 kg.

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80/R/B/7 and 80/W/B/7

Cultivations, etc.:-
Whittlocks (R): Ploughed: 22 Nov, 1979. Spring-tine cultivated, seed sown: 5 Apr, 1980. N applied: 10 Apr. Weedkillers with fungicide applied: 27 May. Combine harvested: 28 Aug. Previous crops: Grass 1978, w. wheat 1979.
Butt Close (W): Ploughed: 5 Nov, 1979. Heavy spring-tine cultivated: 28 Feb, 1980. N applied, spring-tine cultivated with crumbler attached: 25 Mar. Seed sown: 26 Mar. Weedkillers applied: 8 May. Fungicide applied: 5 June. Combine harvested: 20 Aug. Previous crops: S. barley 1978, 1979.

NOTE: Estimates of numbers of aphids were made in June.

80/R/B/7 WHITTLOCKS(R)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N APH	38	75	113	113+DMS	MEAN
VARIETY					
ARKROYAL	6.19	6.21	6.17	5.67	6.06
ATHOS	5.56	5.80	6.33	6.51	6.05
AT+TY+GE	5.90	6.69	6.72	6.35	6.42
GEORGIE	6.08	6.86	6.85	6.59	6.60
JUPITER	6.44	5.71	6.33	5.32	5.95
KEG	5.38	6.00	5.95	6.15	5.87
KORU	6.46	6.51	6.15	6.48	6.40
PORTHOS	6.01	6.05	6.07	6.39	6.13
SIMON	5.55	5.53	5.45	5.47	5.50
TRIUMPH	6.67	6.65	7.37	7.24	6.99
MEAN	6.03	6.20	6.34	6.22	6.20

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N APH	VARIETY N APH
SED	0.248	0.186	0.389
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.333
N APH			0.354

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.VARIETY	18	0.303	4.9
BLOCK.N APH	6	0.228	3.7
BLOCK.VARIETY.N APH	54	0.357	5.8

GRAIN MEAN DM% 82.6

PLOT AREA HARVESTED 0.00130

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80/W/B/7 BUTT CLOSE(W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N APH / VARIETY	38	75	113	113+DMS	MEAN
ARKROYAL	4.01	4.95	5.89	6.28	5.28
ATHOS	3.39	4.30	5.11	5.28	4.52
AT+TY+GE	3.63	4.58	5.63	5.83	4.92
GEORGIE	3.60	4.53	5.09	5.41	4.66
JUPITER	4.00	5.09	5.88	6.31	5.32
KEG	3.48	4.71	5.45	5.63	4.82
KORU	4.21	5.10	6.15	6.22	5.42
PORTHOS	3.66	4.28	4.73	5.41	4.52
SIMON	3.48	4.70	5.35	5.60	4.78
TRIUMPH	3.96	4.62	5.98	6.22	5.20
MEAN	3.74	4.69	5.53	5.82	4.94

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N APH	VARIETY N APH
SED	0.187	0.096	0.257
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY			0.198
N APH			0.245

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.VARIETY	18	0.230	4.6
BLOCK.N APH	6	0.118	2.4
BLOCK.VARIETY.N APH	54	0.223	4.5

GRAIN MEAN DM% 81.7

PLOT AREA HARVESTED 0.00173

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80/R/B/8 and 80/W/B/8

SPRING BARLEY

PHYSIOLOGICAL STUDY ON CONTRASTED SITES

Object: To study the effects of a range of nitrogen fertiliser dressings and two contrasted sites on the grain physiology and yield of two varieties of s. barley - Rothamsted (R) Delafield and Woburn (W) Lansome III.

Sponsor: J.N. Gallagher.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 3.0 x 16.2.

Treatments: All combinations of:-

1. VARIETY — Varieties:

ARKROYAL	Ark Royal
PORTHOS	Porthos

2. N — Rates of nitrogen fertiliser (kg N):

R	W
0	0
25	30
50	60
75	90
100	120
125	150

NOTE: Ark Royal was sown at 140 kg and Porthos at 160 kg. These seed rates each gave 350 seeds per square metre.

Basal applications:
Delafield (R): Manures: (0:20:20) at 310 kg. Weedkillers: Dicamba with mecoprop and MCPA ('Banlene Plus' at 5.0 l) in 250 l applied with the fungicide. Fungicide: Tridemorph at 0.53 kg.
Lansome III (W): Manures: FYM at 50 t, (0:20:20) at 310 kg. Weedkillers Mecoprop with bromoxynil and ioxynil ('Brittox' at 3.5 l) in 280 l applied with the tridemorph. Fungicides: Tridemorph at 0.53 kg; triadimefon 0.13 kg in 220 l applied with the insecticide. Insecticide: Demeton-s-methyl at 0.24 l.

Cultivations, etc.:-
Delafield (R): Subsoiled, tines 160 cm apart and 40 cm deep: 12 Nov, 1979. Chisel ploughed twice: 3 Dec, 4 Dec. Spring-tine cultivated: 6 Apr, 1980. PK and N applied: 7 Apr. Spring-tine cultivated, seed sown: 8 Apr. Weedkiller and fungicide applied: 27 May. Combine harvested: 1 Sept. Previous crops: Beans and kale 1978, potatoes 1979.

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80/R/B/8 and 80/W/B/8

Lansome III (W): Subsoiled, tines 140 cm apart and 50 cm deep: 12 Aug, 1979. FYM applied, ploughed: 21 Aug. Heavy spring-tine cultivated: 29 Feb, 1980. PK applied: 13 Mar. Heavy spring-tine cultivated: 4 Apr. N applied, spring-tine cultivated with crumbler attached: 5 Apr. Seed sown: 10 Apr. Weedkiller with tridemorph applied: 30 May. Triadimefon with insecticide applied: 3 July. Combine harvested: 28 Aug. Previous crops: S. barley 1978, grass 1979.

NOTES: (1) Plant populations were counted at Rothamsted and Woburn and crop cover and growth were assessed at Woburn.
(2) Because of rabbit damage the yield from one plot at Rothamsted was lost with treatment combination, VARIETY ARKROYAL N 50. An estimated value was used in the analysis.

80/R/B/8 DELAFIELD (R)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	25	50	75	100	125	MEAN
VARIETY							
ARKROYAL	4.53	5.60	5.65	6.65	6.63	6.27	5.89
PORTHOS	4.83	5.39	6.28	6.37	6.63	6.97	6.08
MEAN	4.68	5.50	5.96	6.51	6.63	6.62	5.98

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N	VARIETY N
SED	0.105	0.183	0.258

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	21	0.316	5.3

GRAIN MEAN DM% 77.1

PLOT AREA HARVESTED 0.00229

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80/W/B/8 LANSOME III (W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	30	60	90	120	150	MEAN
VARIETY							
ARKROYAL	4.07	5.01	6.42	6.49	7.23	7.80	6.17
PORTHOS	4.02	4.61	5.99	6.30	6.88	6.90	5.78
MEAN	4.04	4.81	6.20	6.40	7.06	7.35	5.98

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N	VARIETY N
SED	0.177	0.307	0.434

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.532	8.9

GRAIN MEAN DM% 77.4

PLOT AREA HARVESTED 0.00228

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80/R/B/9

SPRING BARLEY

CONTROLLED DROP APPLICATION OF TRIDEMORPH

Object: To compare controlled drop application with conventional spraying on the deposition of spray material, control of mildew and on the yield of s. barley - Gt. Harpenden II.

Sponsors: F.T. Phillips, P. Etheridge, A.J. Arnold, B. Pye.

Design: 3 randomised blocks of 11 plots.

Whole plot dimensions: 4.27 x 24.4.

Treatments: All combinations of:-

1. SPRAYER	Sprayer and drop density:	
	CDA 1	Controlled drop application sprayer, standard drop density
	CDA 2	Controlled drop application sprayer, twice standard drop density
	HYDRAUL	Hydraulic sprayer
2. TRI RATE	Rates of applying tridemorph (on 12 June, 1980):	
	1	Standard, 525 g
	1/2	Half standard, 263 g
	1/4	Quarter standard, 132 g

plus two extra plots

EXTRA	
NONE	Unsprayed
CDA R 1	Controlled drop application sprayer, reduced drop density, applying standard rate tridemorph

NOTES (1) CDA sprayer applied tridemorph in 19 l.
(2) Hydraulic sprayer applied tridemorph in 340 l.

Basal applications: Manures: (20:10:10) at 450 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 5.0 l) in 250 l.

Seed: Wing, sown at 160 kg.

Cultivations, etc.:- Ploughed: 13 Nov, 1979. Spring-tine cultivated: 5 Apr, 1980. Seed sown: 6 Apr. Weedkillers applied: 25 May. Combine harvested: 1 Sept. Previous crops: S. beans 1978, w. wheat 1979.

NOTE: Observations were made on patterns of spray deposition using very small quantities of permethrin as a chemical marker. Mildew was assessed twice during the season.

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80/R/B/9

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TRI RATE SPRAYER	1	1/2	1/4	MEAN
CDA 1	4.72	4.36	4.96	4.68
CDA 2	4.95	4.72	4.60	4.76
HYDRAUL	5.65	4.88	4.54	5.02
MEAN	5.11	4.65	4.70	4.82

EXTRA	NONE	CDA R 1	MEAN
	4.34	4.81	4.57

GRAND MEAN 4.77

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	SPRAYER	TRI RATE	SPRAYER TRI RATE & EXTRA
SED	0.304	0.175	0.175	0.304

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.372	7.8

GRAIN MEAN DM% 84.4

PLOT AREA HARVESTED 0.00520

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80/R/B/14

SPRING BARLEY

SOWING DATES AND APHICIDES

Object: To study the effects of three aphicides on the incidence of aphids and on the yield of s. barley sown on two dates - Whittlocks.

Sponsor: G.C. Scott.

Design: 4 randomised blocks of 10 plots.

Whole plot dimensions: 8.53 x 12.2.

Treatments: All combinations of:-

1. SOWDATE — Dates of sowing:

   24 MARCH
   28 APRIL

2 APHICIDE — Aphicides:

NONE	None
DEMET 1	Demeton-s-methyl at 0.12 kg applied once on 16 July 1980
PERMET 1	Permethrin at 0.10 kg on 16 July
PIRIM 1	Pirimicarb at 0.14 kg on 16 July
DEMET R	Demeton-s-methyl at 0.24 kg on 23 June and 7 July and at 0.12 kg on 16 July

NOTE: Spray treatments were applied in 560 l.

Basal applications: Manures: (20:10:10) at 450 kg, combine drilled. Weedkillers: Dicamba with mecoprop and MCPA (as 'Banlene Plus' at 5.0 l) in 250 l. Fungicide: Tridemorph at 0.53 kg applied with the weedkillers.

Seed: Georgie, sown at 160 kg.

Cultivations, etc.:- Ploughed: 22 Nov, 1979. Spring-tine cultivated, for the first sowing: 24 Mar, 1980. Rotary harrowed for the second sowing: 28 Apr. Weedkiller applied to first sowing: 27 May. Weedkiller applied to second sowing: 9 June. Combine harvested: 28 Aug. Previous crops: Grass 1978, w. wheat 1979.

NOTES: Aphid numbers were assessed twice per week from 9 June to 6 Aug. BYDV was assessed in June and July. Stem borers were assessed on three occasions. Numbers of tillers and ears were counted at maturity and 1000 grain weights were measured.

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80/R/B/14

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APHICIDE / SOWDATE	NONE	DEMET 1	PERMET 1	PIRIM 1	DEMET R	MEAN
24 MARCH	5.91	5.91	6.09	6.07	6.39	6.08
28 APRIL	3.77	4.30	4.15	4.18	4.73	4.23
MEAN	4.84	5.11	5.12	5.12	5.56	5.15

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SOWDATE	APHICIDE	SOWDATE APHICIDE
SED	0.102	0.161	0.228

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	27	0.323	6.3

GRAIN MEAN DM% 81.4

PLOT AREA HARVESTED 0.00260

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80/R/O/1

SPRING OATS

VARIETIES AND STEM NEMATODE

Object: To study the effects of the stem nematode, Ditylenchus dipsaci, on resistant and susceptible varieties of oat - Fosters O & E VI W and Highfield O & E III.

Sponsor: A.G. Whitehead.

Design: On each site: 3 randomised blocks of 7 plots.

Whole plot dimensions: 2.29 x 3.05.

Treatments: On each site:

VARIETY	Varieties and susceptibility to stem nematode:
MA AB R	Manod, ex Aberystwyth, resistant
MA RO R	Manod, ex Rothamsted, resistant
OSPREY S	Maris Osprey, susceptible
PANEMA R	Panema, resistant
PENNAL R	Pennal, resistant
PENRTH R	Peniarth, resistant
TABARD S	Tabard, susceptible

Standard applications:
To both sites: Manures: (20:10:10) at 390 kg. Weedkillers: Mecoprop with bromoxynil and ioxynil (as 'Brittox' at 3.5 l) in 220 l.
To Highfield only: Weedkillers: Dicamba with mecoprop and MCPA on two occasions (as 'Tetralex Plus', at 5.3 l on the first and at 7.0 l on the second occasion) in 220 l. Fungicide: Triadimefon at 0.13 kg in 220 l.

Seed: Sown at 190 kg.

Cultivations, etc.:-
Fosters: NPK applied, spring-tine cultivated: 28 Feb, 1980. Spike rotary cultivated, seed sown: 29 Feb. Weedkillers applied: 6 May. Combine harvested: 22 Aug. Previous crops: W. oats 1978, fallow 1979.
Highfield: NPK applied, spring-tine harrowed, spike rotary cultivated, seed sown: 4 Mar, 1980. 'Brittox' applied: 5 May. 'Tetralex Plus' applied: 19 May. Fungicide applied: 22 May. 'Tetralex Plus' applied: 4 June. Combine harvested: 28 Aug. Previous crops: W. oats 1978, s. beans 1979.

NOTE: Stem nematodes in the soil were assessed at sowing and after harvest. Infestation of plants was assessed in mid May.

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80/R/0/1

FOSTERS

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY	MA AB R	MA RO R	OSPREY S	PANEMA R	PENNAL R	PENRTH R	TABARD S	MEAN
	4.64	5.53	5.29	6.72	7.15	6.41	7.70	6.21

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY
SED	0.376

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.461	7.4

GRAIN MEAN DM% 83.7

PLOT AREA HARVESTED 0.00039

HIGHFIELD

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY	MA AB R	MA RO R	OSPREY S	PANEMA R	PENNAL R	PENRTH R	TABARD S	MEAN
	2.40	4.60	4.33	4.71	4.46	4.84	5.80	4.45

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY
SED	0.368

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.450	10.1

GRAIN MEAN DM% 79.8

PLOT AREA HARVESTED 0.00039

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80/R/BE/1

WINTER BEANS

FUNGICIDES

Object: To study the effects of times of applying four fungicides on the incidence of Chocolate Spot (Botrytis spp.) and on the yield of w. beans - Geescroft.

Sponsors: A. Bainbridge, G.R. Cayley, M.E. Finney.

Design: Single replicate of 32 plots.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

1. FUNGCIDE — Fungicides (applied at 0.5 kg on each occasion):

BENOMYL	Benomyl
IPRODION	Iprodione
PROCHLOR	Prochloraz
THIABEND	Thiabendazole

2. APP TIME — Application times of fungicides:

	21 Dec, 1979	16 Apr, 1980	5 June
NONE	None	None	None
E	Sprayed	None	None
M	None	Sprayed	None
L	None	None	Sprayed
E+M	Sprayed	Sprayed	None
E+L	Sprayed	None	Sprayed
M+L	None	Sprayed	Sprayed
E+M+L	Sprayed	Sprayed	Sprayed

NOTE: Fungicides were applied in 340 l.

Basal applications: Weedkillers: Glyphosate at 1.5 kg in 220 l. Trietazine and simazine (as 'Remtal SC' at 2.8 l) in 220 l.

Seed: Throws MS, sown at 250 kg.

Cultivations, etc.:- Glyphosate applied: 12 Sept, 1979. Ploughed: 26 Sept. Rotary harrowed: 4 Oct. Seed sown: 5 Oct. 'Remtal SC' applied: 6 Oct. Combine harvested: 26 Aug, 1980. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Seedling emergence and percentage leaf area affected by Botrytis spp. were estimated and 1000 grain weights were measured.

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80/R/BE/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APP TIME / FUNGCIDE	E	M	L	E+M	E+L	M+L	E+M+L	MEAN
BENOMYL	4.23	3.51	4.22	4.27	4.83	4.71	4.62	4.34
IPRODION	4.49	3.33	4.66	4.43	4.61	3.96	4.79	4.32
PROCHLOR	3.17	3.87	4.42	3.64	4.17	4.31	4.27	3.98
THIABEND	4.24	3.63	3.23	3.87	4.07	3.40	3.89	3.76
MEAN	4.03	3.59	4.13	4.05	4.42	4.09	4.39	4.10

APP TIME NONE 3.97

GRAND MEAN 4.09

GRAIN MEAN DM% 81.8

PLOT AREA HARVESTED 0.00279

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80/R/BE/2

WINTER BEANS

CONTROL OF SITONA

Object: To study the effects of two insecticides on the incidence of Sitona lineatus and on the yield of w. beans - Geescroft.

Sponsors: R. Bardner, D.C. Griffiths, K.E. Fletcher.

Design: 4 randomised blocks of 3 plots.

Whole plot dimensions: 5.33 x 13.7.

Treatments:

INSCTCDE	Insecticides:
NONE	None
CARBOFUR	Carbofuran at 2.24 kg, as granules on 1 Apr, 1980
PERMETH	Permethrin at 0.15 kg, as a foliar spray in 340 l on 15 Apr

Basal applications: Weedkillers: Glyphosate at 1.5 kg in 220 l. Trietazine and simazine (as 'Remtal SC' at 2.8 l) in 220 l. Fungicides: Benomyl at 0.56 kg in 250 l.

Seed: Throws MS, sown at 250 kg.

Cultivations, etc.:- Glyphosate applied: 12 Sept, 1979. Ploughed: 26 Sept. Rotary harrowed: 4 Oct. Seed sown: 5 Oct. 'Remtal SC' applied: 6 Oct. Fungicide applied: 9 May, 1980. Combine harvested: 26 Aug. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Plant counts were made in January, and leaf notching by adult Sitona was assessed twice in May. Soil cores were examined for larval populations in June and August.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE	NONE	CARBOFUR	PERMETH	MEAN
	4.72	4.93	4.79	4.81

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	INSCTCDE
SED	0.110

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	6	0.156	3.2

GRAIN MEAN DM% 83.7 PLOT AREA HARVESTED 0.00293

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80/R/BE/4

SPRING BEANS

PRECISION SOWING

Object: To study the effects of precision sowing and four seed rates on the yield of s. beans - Summerdells I.

Sponsor: J. McEwen.

Design: 3 blocks of 8 plots, randomisation restricted.

Whole plot dimensions: STANDARD : 4.27 x 8.23
PRECISION : 3.25 x 8.23

Treatments: All combinations of:-

1. DRILL — Drills and spacing between rows:

   STANDARD — Standard farm drill sowing seed irregularly in rows 18 cm (7 ins) apart
   PRECISN — Stanhay precision drill sowing seed evenly-spaced in rows 20 cm (8 ins) apart

2. POPULATN — Plant populations in thousands per hectare:

	Target population	Population achieved	
		STANDARD	PRECISN
3	300	149	251
4	400	250	314
5	500	285	301
6	600	359	322

NOTES: (1) All populations achieved were substantially less than intended. The precision drill gave very small differences between populations achieved.
(2) Centres of plots were damaged by wheelings. Yields and figures for populations achieved were taken from an undamaged strip, three to five rows wide, from one side of each plot excluding the two outer rows.

Basal applications: Manures: Chalk at 7.5 t. Weedkillers: Trietazine with simazine (as 'Remtal SC' at 2.5 l) in 250 l. Insecticide: Permethrin at 0.10 kg in 340 l.

Seed: Minden.

Cultivations, etc.:- Chalk applied: 9 Oct, 1979. Ploughed: 30 Oct. Rotary harrowed, seed sown: 5 Mar, 1980. Weedkillers applied: 21 Mar. Insecticide applied: 23 Apr. Combine harvested: 18 Sept. Previous crops: S. barley 1978 and 1979.

NOTE: Components of yield were measured at maturity.

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80/R/BE/4

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

POPULATN / DRILL	3	4	5	6	MEAN
STANDARD	2.19	3.05	2.81	3.24	2.82
PRECISN	3.80	3.89	3.57	3.67	3.73
MEAN	3.00	3.47	3.19	3.45	3.28

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	DRILL	POPULATN	DRILL POPULATN
SED	0.127	0.180	0.255

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	14	0.312	9.5

GRAIN MEAN DM% 78.4

PLOT AREA HARVESTED 0.00067

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80/R/BE/5

SPRING BEANS

EFFECTS OF PEST AND PATHOGEN CONTROL

Object: To assess the benefits from three amounts of pest and disease control on irrigated and unirrigated s. beans - Gt Knott II.

Sponsors: J. McEwen, R. Bardner, A.J. Cockbain, J.M. Day, K.E. Fletcher, B.J. Legg, G.A. Salt, R.M. Webb, J.F. Witty, D.P. Yeoman.

Design: 4 randomised blocks of 2 plots split into 3.

Whole plot dimensions: 4.27 x 13.7.

Treatments: All combinations of:-

Whole plots

1.	IRRIGATN	Irrigation:
	NONE	None
	FULL	Full (total 124 mm)

Sub plots

2.	PATHCONT	Pest and pathogen control
	STANDARD	None
	ENHANCED	Permethrin at 0.10 kg on 23 Apr, 1980 Pirimicarb at 0.14 kg on 2 June Benomyl at 0.56 kg on 16 July
	FULL	Aldicarb at 10 kg on 3 Mar Permethrin at 0.10 kg on 23 Apr Aluminium tris-ethyl phosphonate at 2.0 kg on 23 Apr Pirimicarb at 0.14 kg on 2 June Benomyl at 0.56 kg on 16 July Benomyl at 0.56 kg on 18 Aug

NOTES: (1) A planned application of pirimicarb to all PATH CONT treatments to control black fly (Aphis fabae) was not applied as numbers of this pest were few.

(2) Irrigation was applied to reduce a deficit of 50 mm to 25 mm before pod set, and from 80 mm to 55 mm after pod set. (mm water):

17 May	9
19 May	21
24 May	25
27 May	20
5 June	6
6 June	6
8 June	12
13 June	25
	124

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(3) Treatment sprays were applied in 340 l.

Basal applications: Manures: Chalk at 3 t. Weedkillers: Trietazine with simazine (as 'Remtal SC' at 2.5 l) in 250 l.

Seed: Minden, sown at 150 kg. (500,000 seeds per hectare).

Cultivations, etc.:- Chalk applied: 8 Oct, 1979. Ploughed: 29 Nov. Spring-tine cultivated: 1 Mar, 1980. Spring-tine cultivated, rotary harrowed: 3 Mar. Seed sown: 4 Mar. Weedkillers applied: 21 Mar. Combine harvested: 18 Sept. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Plant counts were made after establishment and components of yield measured before harvest. Total above-ground dry matter and N content were measured in August. Migratory nematodes, root and foliar fungi, aphids, weevils and viruses were counted at intervals during the season. N content of grain was measured.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PATHCONT IRRIGATN	STANDARD	ENHANCED	FULL	MEAN
NONE	3.91	4.64	5.63	4.72
FULL	3.64	4.26	4.88	4.26
MEAN	3.77	4.45	5.25	4.49

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PATHCONT	IRRIGATN* PATHCONT
SED	0.186	0.263

* WITHIN THE SAME LEVEL OF IRRIGATN ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	12	0.372	8.3

GRAIN MEAN DM% 78.4

SUB PLOT AREA HARVESTED 0.00293

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80/R/BE/6

SPRING BEANS

CONTROL OF SITONA

Object: To study the effects of three insecticides on the incidence of Sitona and on the yield of s. beans - Gt. Knott II.

Sponsors: R. Bardner, D.C. Griffiths, K.E. Fletcher.

Design: 4 randomised blocks of 8 plots.

Whole plot dimensions: 5.33 x 9.14.

Treatments:

INSCTCDE	Forms, rates and methods of application of insecticides:
NONE	None (duplicated)
CAR 1 CD	Carbofuran at 1.70 kg, combine drilled
CAR 2 CD	Carbofuran at 2.24 kg, combine drilled
PHO 1 CD	Phorate at 1.70 kg, combine drilled
PHO 2 CD	Phorate at 2.24 kg, combine drilled
PER 1 FS	Permethrin at 0.05 kg, foliar spray
PER 2 FS	Permethrin at 0.15 kg, foliar spray

NOTE: Permethrin was applied in 340 l on 15 Apr, 1980.

Basal applications: Manures: Chalk at 7.5 t. Weedkillers: Trietazine and simazine (as 'Remtal SC' at 2.5 l) in 250 l.

Seed: Minden, sown at 180 kg.

Cultivations, etc.:- Chalk applied: 8 Oct, 1979. Ploughed: 29 Nov. Spring-tine cultivated: 1 Mar, 1980 and 3 Mar. Seed sown: 4 Mar. Weedkillers applied: 21 Mar. Combine harvested: 19 Sept. Previous crops: W. wheat 1978, s. barley 1979.

NOTES: (1) Leaf notching by adult Sitona was assessed twice in May; soil cores were examined for larval populations in June. In August soil cores were examined for root damage and a full growth analysis was made on ten plants per plot.
(2) Because of an error in applying treatments, four plots were treated as missing, one of each, CAR 1 CD, CAR 2 CD, PER 1 FS, PER 2 FS. Estimated values were used in the analysis.

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80/R/BE/6

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE	NONE	CAR 1 CD	CAR 2 CD	PHO 1 CD	PHO 2 CD	PER 1 FS	PER 2 FS	MEAN
	4.02	5.31	5.49	5.06	5.21	4.19	4.55	4.73

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	INSCTCDE	
SED	0.220	MIN REP
	0.190	MAX-MIN

	INSCTCDE
MAX-MIN	NONE V ANY OF THE REMAINDER
MIN REP	ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	18	0.311	6.6

GRAIN MEAN DM% 79.8

PLOT AREA HARVESTED 0.00293

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80/R/BE/7

SPRING BEANS

PYRETHROIDS AND SITONA

Object: To study the effects of four pyrethroid insecticides, applied as foliar sprays, on the incidence of Sitona and on the yield of s. beans - Gt. Knott II.

Sponsors: R. Bardner, D.C. Griffiths, K.E. Fletcher.

Design: 4 randomised blocks of 5 plots.

Whole plot dimensions: 5.33 x 9.14.

Treatments:

PYRETH	Pyrethroids, applied in 340 l on 15 Apr, 1980.
NONE	None
CYPERMET	Cypermethrin at 0.06 kg
DECAMETH	Decamethrin at 0.03 kg
FENVALER	Fenvalerate at 0.06 kg
PERMETH	Permethrin at 0.15 kg

NOTE: Decamethrin has now been re-named deltamethrin.

Basal applications: Manures: Chalk at 7.5 t. Weedkillers: Trietazine with simazine (as 'Remtal SC' at 2.5 l) in 250 l.

Seed: Minden, sown at 180 kg.

Cultivations, etc.:- Chalk applied: 8 Oct, 1979. Ploughed: 29 Nov. Spring-tine cultivated: 1 Mar, 1980 and 3 Mar. Seed sown: 3 Mar. Weedkillers applied: 21 Mar. Combine harvested: 18 Sept. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Leaf notching by adult Sitona lineatus was assessed in May, and soil cores were examined for larval populations in June.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

PYRETH	NONE	CYPERMET	DECAMETH	FENVALER	PERMETH	MEAN
	4.06	4.20	4.68	4.81	4.47	4.44

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	PYRETH
SED	0.173

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.244	5.5

GRAIN MEAN DM% 80.4 PLOT AREA HARVESTED 0.00293

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80/R/BE/9

SPRING BEANS

FUNGICIDES

Object: To study the effects of fungicides and methods of application on the incidence of diseases and on the yield of s. beans - Long Hoos III 7.

Sponsors: G.A. Salt, J. McEwen, D.P. Yeoman.

Design: 2 randomised blocks of 20 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments: All combinations of:-

1. AL METH — Methods of applying aluminium tris (ethyl phosphonate) ('Aliette')(all rates are of a.i.):

NONE	Not applied
SEEDRESS	Seed dressing at 4.0 g per kg seed
SPRAY E	Early foliar spray at 3.4 kg
SPRAY L	Late foliar spray at 3.4 kg

2. BEN METH — Methods of applying benomyl:

NONE	Not applied
SEEDRESS	Seed dressing at 6.0 g per kg seed
SPRAY E	Early foliar spray at 1.0 kg
SPRAY L	Late foliar spray at 1.0 kg

plus four extra treatments:

EXTRA

NONE	No fungicides
STICKER	Methyl cellulose sticker as used for all seed dressing treatments
BE TH SD	Benomyl + thiram seed dressing (duplicated) at 2.0 g of each material per kg seed

NOTE: (1) Seed was sown by hand in rows 51 cm apart, seed spaced 5 cm apart in the row.
(2) Early foliar sprays were applied on 28 May in 700 l and late sprays on 22 July in 1200 l water.

Basal applications: Weedkillers: Trietazine and simazine (as 'Remtal SC' at 3.0 l) in 340 l. Insecticides: Permethrin at 0.15 kg in 340 l. Pirimicarb at 0.14 kg in 340 l.

Seed: Minden.

Cultivations, etc.:- Ploughed: 14 Nov, 1979. Spring-tine cultivated: 7 Apr, 1980. Power harrowed, seed sown: 8 Apr. Weedkillers applied: 15 Apr. Permethrin applied: 23 May. Pirimicarb applied: 11 July. Hand harvested: 7 Oct. Previous crops: Potatoes 1978, w. wheat 1979.

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80/R/BE/9

NOTE: Emergence counts were made in early June, and root diseases were assessed in late July.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

BEN METH / AL METH	NONE	SEEDRESS	SPRAY E	SPRAY L	MEAN
NONE	4.17	4.65	4.07	5.41	4.58
SEEDRESS	4.67	5.06	4.91	4.98	4.90
SPRAY E	4.75	4.97	4.43	5.04	4.80
SPRAY L	3.61	5.14	5.15	4.85	4.68
MEAN	4.30	4.95	4.64	5.07	4.74

EXTRA	NONE	STICKER	BE TH SD	MEAN
	4.15	5.02	5.11	4.85

GRAND MEAN 4.76

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	AL METH	BEN METH	AL METH BEN METH & EXTRA	
SED	0.509	0.255	0.255	0.509	MIN REP
	0.402			0.402	MAX-MIN

	EXTRA
MAX-MIN	BE TH SD V ANY OF THE REMAINDER
MIN REP	ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	20	0.509	10.7

GRAIN MEAN DM% 87.3

PLOT AREA HARVESTED 0.00015

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80/R/BE/10

SPRING BEANS

RATES AND TIMES OF APPLYING ENTOMOPHTHORA

Object: To study the effects of rates and times of applying the aphid-pathogenic fungus Entomophthora aphidis on the incidence of black aphids, Aphis fabae, and on the yield of s. beans - Gt. Knott II.

Sponsor: N. Wilding.

Design: 3 randomised blocks of 7 plots.

Whole plot dimensions: 2.67 x 2.13.

Treatments:

APH CONT	Chemical and biological aphid control:
NONE	None
	Pirimicarb at 0.14 kg in 340 l:
PIRIM E	Applied early, on 6 June 1980
PIRIM L	Applied later, on 23 June
	E. aphidis applied as a powder of mummified aphids:
E APH1 E	Applied at 0.5 mg per plant early, on 6 June
E APH1 L	Applied at 0.5 mg per plant later, on 21 June
E APH2 E	Applied at 5.0 mg per plant early, on 6 June
E APH2 L	Applied at 5.0 mg per plant later, on 21 June

NOTE: Basal irrigation was applied as follows (mm water):

27 May	25
6 June	6
8 June	19
9 June	12
13 June	12
Total	74

Basal applications: Manures: Chalk at 7.5 t. Weedkillers: Trietazine and simazine (as 'Remtal SC' at 2.5 l) in 250 l.

Seed: Minden, sown at 150 kg.

Cultivations, etc.:- Chalk applied: 8 Oct, 1979. Ploughed: 29 Nov. Spring-tine cultivated: 1 Mar, 1980 and 3 Mar. Seed sown: 3 Mar. Weedkillers applied: 21 Mar. Harvested by hand: 15 Sept. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Visual estimates of aphid numbers were made weekly in June and July and samples of 50 live aphids per plot were examined for infection with Entomophthora and parasites.

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80/R/BE/10

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APH CONT	NONE	PIRIM E	PIRIM L E	APH1 E E	APH1 L E	APH2 E E	APH2 L	MEAN
	4.10	5.15	4.82	4.32	4.08	4.64	4.35	4.49

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	APH CONT
SED	0.455

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.558	12.4

GRAIN MEAN DM% 89.8

PLOT AREA HARVESTED 0.00024

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80/R/BE/11

SPRING BEANS

SPECIES OF ENTOMOPHTHORA

Object: To study the effects of different species of the aphid-pathogenic fungal genus Entomophthora on the incidence of black aphids, Aphis fabae, and on the yield of s. beans - Gt Knott II.

Sponsor: N. Wilding.

Design: 3 randomised blocks of 7 plots.

Whole plot dimensions: 2.67 x 2.13.

Treatments:

APH CONT	Chemical and biological aphid control:
NONE	None
PIRIMICA	Pirimicarb at 0.14 kg in 340 l on 23 June, 1980
	Entomopthora species applied as a powder of mummified aphids at 5 mg per plant on 22 June:
E APH M	E. aphidis
E FRE M	E. fresenii
E PLA M	E planchoniana
E OBS M	E. obscura
	Entomophthora applied as resting spores (ex Pasteur Institute) at 5 x 10" spores per hectare on 19 June:
E OBS S	E. obscura

NOTE: Basal irrigation was applied as follows (mm water):

27 May	25
6 June	6
8 June	19
9 June	12
13 June	12
Total	74

Basal applications: Manures: Chalk at 7.5 t. Weedkillers: Trietazine and simazine (as 'Remtal SC' at 2.5 l) in 250 l.

Seed: Minden, sown at 150 kg.

Cultivations, etc.:- Chalk applied: 8 Oct, 1979. Ploughed: 29 Nov. Spring-tine cultivated: 1 Mar, 1980 and 3 Mar. Seed sown: 3 Mar. Weedkillers applied: 21 Mar. Harvested by hand: 15 Sept. Previous crops: W. wheat 1978, s. barley 1979.

NOTE: Visual estimates of aphid numbers were made weekly in June and July and samples of 50 live aphids per plot were examined for infection with Entomophthora and parasites.

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80/R/BE/11

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APH CONT	NONE	PIRIMICA	E APH M	E FRE M	E PLA M	E OBS M	E OBS S	MEAN
	3.28	4.15	4.28	3.60	2.82	3.04	3.35	3.50

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	APH CONT
SED	0.521

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	12	0.638	18.2

GRAIN MEAN DM% 90.3

PLOT AREA HARVESTED 0.00024

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80/R/BE/12

SPRING BEANS

VARIETIES

Object: To compare agronomic characters and yields of two selections of red-seeded field beans and four white-seeded varieties - Long Hoos III 7.

Sponsors: J. McEwen, D.P. Yeoman.

Design: 4 randomised blocks of 6 plots.

Whole plot dimensions: 2.03 x 2.13.

Treatments:

VARIETY	Varieties:-
REDTICK1	Red tick 1
REDTICK3	Red tick 3
BLAZE	Maris Blaze (white-seeded)
HERRA	Herra (white-seeded)
MINDEN	Minden (white-seeded)
TOPLESS	Topless determinant (white-seeded ex P.B.I. Cambridge)

NOTE: Seed was sown by hand in rows 51 cm apart, seed spaced 5 cm apart in the row.

Basal applications: Weedkillers: Trietazine and simazine (as 'Remtal SC' at 3.0 l) in 340 l. Insecticides: Permethrin at 0.15 kg in 340 l. Pirimicarb at 0.14 kg in 340 l.

Cultivations, etc.:- Ploughed: 14 Nov, 1979. Spring-tine cultivated: 7 Apr, 1980. Power harrowed, seed sown: 8 Apr. Weedkillers applied: 15 Apr. Permethrin applied: 23 May. Pirimicarb applied: 11 July. Harvested by hand: 6 Oct. Previous crops: Potatoes 1978, s. barley 1979.

NOTE: Plant counts were made after establishment. Components of yield were measured at maturity. N content of grain was measured.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY	REDTICK1	REDTICK3	BLAZE	HERRA	MINDEN	TOPLESS	MEAN
	4.19	4.19	5.09	4.24	4.34	2.57	4.10

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY
SED	0.302

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	15	0.427	10.4

GRAIN MEAN DM% 89.8 PLOT AREA HARVESTED 0.00015

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80/R/BE/13

SPRING BEANS

FOLIAR NUTRITION

Object: To study the effects of foliar nutrition on the yield and nitrogen uptake of spring beans - Garden Plot 11.

Sponsors: J.M. Day, J.F. Witty.

Design: 8 randomised blocks of 5 plots.

Whole plot dimensions: 2.54 x 3.66.

Treatments:

NUTRIENT	Foliar nutrients:-
0	None
U	Urea
U + KS	Urea + potassium sulphate
U + KP	Urea + potassium polyphosphate
U + KS + KP	Urea + potassium sulphate + potassium polyphosphate

NOTE: (1) Rates of nutrients (kg element) applied on each of four spray occasions:

	N	P	K in sulphate	K in phosphate	S
0	-	-	-	-	-
U	20	-	-	-	-
U + KS	20	-	7.5	-	3.0
U + KP	20	2.0	-	4.9	-
U + KS + KP	20	2.0	2.6	4.9	1.0

(2) Sprays were applied in 540 l on 11 July, 1980, 18 July, 25 July and 1 August.
(3) Urea was labelled with 15N.

Basal applications: Manure: Chalk at 2.9 t. Weedkillers: Trietazine and simazine (as 'Remtal SC' at 3.0 l) in 340 l. Insecticide: Permethrin at 0.15 kg in 340 l.

Seed: Minden, sown at 220 kg.

Cultivations, etc.:- Chalk applied: 18 Oct, 1979. Ploughed: 15 Nov. Spring-tine cultivated: 7 Apr, 1980. Power harrowed, seed sown: 8 Apr. Weedkillers applied: 15 Apr. Insecticide applied: 12 May. Hand harvested: 24 Sept. Previous crops: W. wheat 1978 and 1979.

NOTE: The ratios of 14N to 15N in the grain was measured.

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80/R/BE/13

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

NUTRIENT	0	U	U+KS	U+KP	U+KS+KP	MEAN
	4.04	4.38	3.92	4.10	4.09	4.11

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	NUTRIENT
SED	0.290

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	28	0.579	14.1
PLOT AREA HARVESTED	0.00093		

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80/R/BE/16

SPRING BEANS

VICIA CRYPTIC VIRUS

Object: To study the effects on growth and yield of field beans of the presence of virus-like particles (provisionally named vicia cryptic virus (VCV)) found in the sap of certain plants - Long Hoos III 1.

Sponsors: A.J. Cockbain, R.H. Kenten.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 1.52 x 2.44.

Treatments:

LINE V	Line number and VCV infection:
7 V	Line 7, VCV particles present
14 V	" 14, " " "
20 V	" 20, " " "
39 V	" 39, " " "
47 V	" 47, " " "
56 V	" 56, " " "
13 0	" 13, " " absent
15 0	" 15, " " "
17 0	" 17, " " "
38 0	" 38, " " "
14 1 0	" 14 1," " "
20 1 0	" 20 1," " "

NOTE: Seed was sown by hand in rows 51 cm apart seed spaced 30 cm apart in the row.

Basal applications: Weedkillers: Trietazine and simazine (as 'Remtal SC' at 3.0 l) in 340 l. Aphicide: Permethrin at 0.15 kg in 340 l. Pirimicarb at 0.14 kg in 340 l.

Seed: Minden.

Cultivations, etc.:- Ploughed: 14 Nov, 1979. Spring-tine cultivated: 7 Apr, 1980. Power harrowed: 9 Apr. Seed sown: 10 Apr. Weedkillers applied: 15 Apr. Permethrin applied: 23 May. Pirimicarb applied: 11 July. Harvested by hand: 3 Oct. Previous crops: Potatoes 1978, s. barley 1979.

NOTE: Plant counts were made at emergence. Pest and disease incidence and growth parameters were assessed throughout the season.

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80/R/BE/16

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

LINE V	
7 V	1.48
14 V	1.84
20 V	1.71
39 V	1.74
47 V	0.80
56 V	2.41
13 0	2.25
15 0	1.78
17 0	2.34
38 0	1.00
14 1 0	2.19
20 1 0	0.94
MEAN	1.71

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	LINE V
SED	0.314

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.385	22.6

GRAIN MEAN DM% 89.0

PLOT AREA HARVESTED 0.00037

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80/R/BB/1

BROAD BEANS

VICIA CRYPTIC VIRUS

Object: To study the effects on growth and dry-grain yield of broad beans of the presence of virus-like particles (provisionally named vicia cryptic virus (VCV)) found in the sap of certain plants - Long Hoos III 1.

Sponsors: A.J. Cockbain, R.H. Kenten.

Design: 3 randomised blocks of 12 plots.

Whole plot dimensions: 0.51 x 2.44.

Treatments

LINE V	Line number and VCV infection:
106 V	Line 106, VCV particles present
107 V	" 107, " " "
116 V	" 116, " " "
123 V	" 123, " " "
131 V	" 131, " " "
137 V	" 137, " " "
109 0	" 109, " " absent
111 0	" 111, " " "
114 0	" 114, " " "
117 0	" 117, " " "
118 0	" 118, " " "
124 0	" 124, " " "

NOTE: Seed was sown by hand in rows 51cm apart seed spaced 5cm apart in the row.

Basal applications: Weedkillers: Trietazine and simazine (as 'Remtal SC' at 3.0 l) in 340 l. Insecticide: Permethrin at 0.15 kg in 340 l. Pirimicarb at 0.14 kg in 340 l.

Seed: Threefold White.

Cultivations, etc.:- Ploughed: 14 Nov, 1979. Spring-tine cultivated 7 Apr, 1980. Power harrowed: 9 Apr. Seed sown: 10 Apr. Weedkillers applied: 15 Apr. Permethrin applied: 23 May. Pirimicarb applied: 11 July. Harvested by hand: 1 Oct. Previous crops: Potatoes 1978, s. barley 1979.

NOTES: Plant counts were made at emergence. Pest and disease incidence and growth parameteres were assessed throughout the season.

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80/R/BB/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

LINE	V	
106	V	1.05
107	V	2.31
116	V	2.61
123	V	1.87
131	V	2.12
137	V	2.34
109	0	1.76
111	0	2.32
114	0	1.82
117	0	3.35
118	0	2.60
124	0	2.57
MEAN		2.23

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	LINE V
SED	0.420

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	22	0.515	23.1

GRAIN MEAN DM% 88.8

PLOT AREA HARVESTED 0.00012

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80/R/RA/1

WINTER OILSEED RAPE

FUNGICIDES

Object: To study the effects of a range of fungicides on canker, light leaf spot, mildew and yield of winter oilseed rape - Summerdells I.

Sponsors: C.J. Rawlinson, G.R. Cayley.

Design: 3 randomised blocks of 18 plots.

Whole plot dimensions: 4.27 x 9.14.

Treatments: All combinations of:-

1. FUNGCIDE — Fungicides applied at 0.5 kg a.i. on each occasion:

BENOMYL	Benomyl
BTS	'BTS 40542' (prochloraz)
CGA	'CGA 48988A' (metalaxyl)
IMAZALIL	Imazalil
THIABEND	Thiabendazole

2. APP TIME — Times of applying fungicides:

AUT	Autumn on 13 November, 1979
SPNG	Spring on 27 February, 1980
AUT+SPNG	Autumn + spring

plus one extra treatment (three plots per block):

EXTRA

NONE	No fungicides

Basal applications: Manures: (13.13.20) at 380 kg. 'Nitro-Chalk' at 750 kg. Weedkillers: Dalapon at 0.95 kg with propyzamide at 0.70 kg in 220 l. 3, 6-Dichloropicolinic acid with benazolin ('Benazolox' at 1.0 kg) in 250 l. Desiccant: Diquat at 0.56 kg ion in 220 l.

Seed: Primor, dressed with gamma HCH. Benomyl and thiram, sown at 9 kg.

Cultivations, etc.:- NPK applied, heavy spring-tine harrowed twice: 10 Sept, 1979. Chisel ploughed, rotary harrowed, seed sown, 11 Sept. Dalapon and propyzamide applied: 2 Nov. N applied: 20 Feb, 1980. 'Benazolox' applied: 29 Feb. Desiccant applied: 25 July. Hand harvested: 23 July. Previous crops: Winter oilseed rape 1978 and 1979.

NOTES: (1) The crop was damaged by sparrows shortly before maturity and despite hand harvesting the grain yields presented reflect considerable loss from this cause. Straw yields were not affected and are presented as better indicators of the effects of treatments on crop growth.
(2) Growth and disease assessments were made monthly from March until harvest.

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80/R/RA/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

APP TIME FUNGCIDE	AUT	SPNG	AUT+SPNG	MEAN
BENOMYL	1.18	0.69	1.21	1.03
BTS	1.33	0.97	0.92	1.07
CGA	0.72	0.55	0.69	0.65
IMAZALIL	1.11	1.07	1.47	1.22
THIABEND	0.98	0.88	0.65	0.84
MEAN	1.06	0.83	0.99	0.96

NONE 0.64

GRAND MEAN 0.91

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	FUNGCIDE	APP TIME	FUNGCIDE APP TIME & NONE
SED	0.155	0.120	0.269 0.220*

* FOR COMPARISONS INVOLVING NONE ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	36	0.330	36.3

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

APP TIME FUNGCIDE	AUT	SPNG	AUT+SPNG	MEAN
BENOMYL	6.45	5.35	7.56	6.45
BTS	6.96	5.45	6.02	6.14
CGA	4.39	3.43	4.09	3.97
IMAZALIL	6.03	5.91	7.95	6.63
THIABEND	5.24	4.90	5.05	5.06
MEAN	5.81	5.01	6.13	5.65

NONE 4.02

GRAND MEAN 5.38

PLOT AREA HARVESTED 0.000005

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80/R/RA/2

WINTER OILSEED RAPE

STUBBLE TREATMENT & PHOMA

Object: To study the effects of a range of weedkillers and fungicides applied to the stubble of a previous oilseed rape crop on the incidence of Phoma and on the yield of the current crop - Summerdells I.

Sponsor: C.J. Rawlinson.

Design: 2 randomised blocks of 10 plots.

Whole plot dimensions: 4.27 x 9.14.

Treatments:

TREATMNT	Treatments applied to stubble of 1979 crop:	
NONE	None (duplicated)	
	Weedkillers:	
W DINOS	Dinoseb amine + oil ('Desicoil' at 5.0 l)	
W LINUR	Linuron	at 0.5 kg
W PARAQ	Paraquat	at 1 kg ion
W GLYPH	Glyphosate	at 1.8 kg
	Fungicides:	
F BEN+TH	Benomyl at 1 kg + thiram	at 1 kg
F TRIAD	Triadimefon	at 1 kg
F THIAB	Thiabendazole	at 1 kg
F IPROD	Iprodione	at 1 kg

NOTE: Treatments were applied on 29 August, 1979 in 340 l.

Basal applications: Manures: (13:13:20) at 380 kg. 'Nitro-chalk' at 750 kg. Weedkillers: Dalapon at 0.95 kg with propyzamide at 0.70 kg in 220 l. 3, 6-Dichloropicolinic acid with benazolin ('Benazolox' at 1.0 kg) in 250 l. Desiccant: Diquat at 0.56 l in 220 l.

Seed: Primor, dressed with gamma HCH, benomyl and thiram, sown at 9 kg.

Cultivations, etc.:- NPK applied, heavy spring-tine cultivated, twice: 10 Sept, 1979. Chisel ploughed, rotary harrowed, seed sown: 11 Sept. Dalapon and propyzamide applied: 2 Nov. N applied: 20 Feb, 1980. 'Benazolox' applied: 29 Feb. Desiccant applied: 25 July. Combine harvested: 23 July. Previous crops: Winter oilseed rape 1978 and 1979.

NOTES: (1) The crop was damaged by sparrows shortly before maturity and despite hand harvesting the grain yields presented reflect considerable loss from this cause. Straw yields were not affected and are presented as better indicators of the effects of treatments on crop growth.

(2) Diseases were assessed monthly from Nov to July. Growth analysis measurements were made on 23 Apr, 15 May and 23 July.

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80/R/RA/2

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	
NONE	0.91
W DINOS	1.28
W LINUR	0.84
W PARAQ	0.96
W GLYPH	1.03
F BEN+TH	1.26
F TRIAD	1.13
F THIAB	0.72
F IPROD	0.88
MEAN	0.99

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	TREATMNT	
SED	0.228	MIN REP
	0.197	MAX-MIN

	TREATMNT
MAX-MIN	NONE V ANY OF REMAINDER
MIN REP	ANY OF REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.228	23.0

STRAW TONNES/HECTARE

***** TABLES OF MEANS *****

TREATMNT	
NONE	4.85
W DINOS	5.89
W LINUR	4.47
W PARAQ	5.75
W GLYPH	4.84
F BEN+TH	6.28
F TRIAD	7.28
F THIAB	4.07
F IPROD	5.01
MEAN	5.33

PLOT AREA HARVESTED 0.000005

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80/R/PE/1 and 80/W/PE/1

PEAS

CONTROL OF PATHOGENS

Object: To study the effects of a range of pesticides on the incidence of pathogens and on the yield of leafless peas - Rothamsted (R) Long Hoos V 7 and Woburn (W) Gt. Hill III.

Sponsors: A.J. Cockbain, K.E. Fletcher, E.D.M. Macaulay, J. McEwen, G.A. Salt, A.G. Whitehead.

Design: Single replicate of 2 whole plots split into 16.

Whole plot dimensions: 4.57 x 5.49.

Treatments: All combinations of:-

Whole plots

1.	SEEDRATE	Seed rate (kg):
	200	
	400	

Sub plots

2.	NEMACIDE	Nematicide:
	NONE	None
	ALDICARB	Aldicarb at 10 kg to the seedbed on 7 Apr (R), 11 Apr (W)
3.	INSCTCDE(1)	Early insecticide, to control Sitona:
	NONE	None
	PERMETH	Permethrin at 0.15 kg on 7 May (R), 9 May (W)
4.	INSCTCDE(2)	Late insecticide, to control pea moth:
	NONE	None
	PERMETH	Permethrin at 0.15 kg on 18 June
5.	FUNGCIDE	Fungicide:
	NONE	None
	CARBENDA	Carbendazim (as 'Focal SC' at 9.4 l) on 23 July and 14 Aug, (R & W)

NOTE: All treatment sprays were applied in 340 l.

Basal applications:
Long Hoos V 7 (R): Manures: Chalk at 2.9 t. Weedkillers: Glyphosate at 1.5 l in 340 l. Trietazine and simazine (as 'Remtal SC' at 3.0 l in 340 l). Desiccant: Diquat at 0.59 kg ion in 340 l.
Gt. Hill III (W): Manures: Magnesian limestone 7.5 t. (0:14:28) at 340 kg. Weedkillers: Carbetamide (as 'Carbetamex' at 3.1 kg in 280 l). Trietazine and simazine (as 'Remtal SC' at 2.4 l in 340 l). Desiccant: Diquat at 0.59 kg ion in 340 l.

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80/R/PE/1 and 80/W/PE/1

Seed: Filby, dressed thiram.

Cultivations, etc.:-
Long Hoos V 7 (R): Glyphosate applied: 17 Sept, 1979. Chalk applied: 19 Oct. Ploughed: 1 Nov. Spring-tine cultivated, power harrowed, seed sown: 7 Apr, 1980. 'Remtal SC' applied: 15 Apr. Desiccant applied: 25 Aug. Hand harvested: 1 Sept. Previous crops: Potatoes 1978, s. wheat 1979.
Gt. Hill III (W): Manures: Magnesian limestone applied: 29 Sept, 1979. Ploughed: 20 Oct. Spring-tine cultivated, winter beans sown: 24 Oct. Carbetamide applied: 2 Nov. W. beans failed and ploughed in: 12 Feb, 1980. Heavy spring-tine cultivated, PK applied, rotary cultivated, seed sown: 11 Apr. 'Remtal SC' applied: 15 Apr. Desiccant applied: 25 Aug. Hand harvested: 27 Aug. Previous crops: Potatoes 1978, w. wheat 1979.

NOTE: Observations on pests and diseases were made during the season. Nitrogen percentages of grain were measured.

80/R/PE/1 LONG HOOS V (R)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

NEMACIDE	NONE	ALDICARB	MEAN
SEEDRATE			
200	3.86	4.32	4.09
400	3.88	4.18	4.03
MEAN	3.87	4.25	4.06

INSCTCDE(1)	NONE	PERMETH	MEAN
SEEDRATE			
200	4.08	4.10	4.09
400	4.01	4.06	4.03
MEAN	4.04	4.08	4.06

INSCTCDE(1)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	3.86	3.89	3.87
ALDICARB	4.23	4.27	4.25
MEAN	4.04	4.08	4.06

INSCTCDE(2)	NONE	PERMETH	MEAN
SEEDRATE			
200	3.96	4.22	4.09
400	4.14	3.93	4.03
MEAN	4.05	4.07	4.06

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80/R/PE/1 LONG HOOS V (R)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE(2)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	3.81	3.93	3.87
ALDICARB	4.28	4.22	4.25
MEAN	4.05	4.07	4.06

INSCTCDE(2)	NONE	PERMETH	MEAN
INSCTCDE(1)			
NONE	4.11	3.98	4.04
PERMETH	3.99	4.16	4.08
MEAN	4.05	4.07	4.06

FUNGCIDE	NONE	CARBENDA	MEAN
SEEDRATE			
200	3.88	4.29	4.09
400	3.92	4.15	4.03
MEAN	3.90	4.22	4.06

FUNGCIDE	NONE	CARBENDA	MEAN
NEMACIDE			
NONE	3.69	4.06	3.87
ALDICARB	4.11	4.39	4.25
MEAN	3.90	4.22	4.06

FUNGCIDE	NONE	CARBENDA	MEAN
INSCTCDE(1)			
NONE	3.84	4.25	4.04
PERMETH	3.97	4.19	4.08
MEAN	3.90	4.22	4.06

FUNGCIDE	NONE	CARBENDA	MEAN
INSCTCDE(2)			
NONE	4.05	4.04	4.05
PERMETH	3.75	4.40	4.07
MEAN	3.90	4.22	4.06

NEMACIDE	NONE		ALDICARB	
INSCTCDE(1)	NONE	PERMETH	NONE	PERMETH
SEEDRATE				
200	3.79	3.94	4.38	4.25
400	3.92	3.84	4.09	4.28

NEMACIDE	NONE		ALDICARB	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
SEEDRATE				
200	3.65	4.07	4.27	4.36
400	3.97	3.79	4.30	4.07

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80/R/PE/1 LONG HOOS V (R)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE(1)	NONE		PERMETH	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
SEEDRATE				
200	3.94	4.22	3.98	4.21
400	4.27	3.75	4.01	4.11

INSCTCDE(1)	NONE		PERMETH	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
NEMACIDE				
NONE	3.95	3.77	3.68	4.10
ALDICARB	4.27	4.20	4.30	4.23

NEMACIDE	NONE		ALDICARB	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
SEEDRATE				
200	3.57	4.15	4.20	4.43
400	3.81	3.96	4.03	4.34

INSCTCDE(1)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
SEEDRATE				
200	3.88	4.29	3.89	4.30
400	3.80	4.22	4.04	4.08

INSCTCDE(1)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
NEMACIDE				
NONE	3.64	4.08	3.74	4.04
ALDICARB	4.04	4.43	4.19	4.34

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
SEEDRATE				
200	3.87	4.05	3.89	4.54
400	4.24	4.04	3.60	4.26

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
NEMACIDE				
NONE	3.76	3.87	3.62	4.24
ALDICARB	4.35	4.22	3.88	4.55

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
INSCTCDE(1)				
NONE	4.17	4.04	3.50	4.46
PERMETH	3.94	4.05	3.99	4.33

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80/R/PE/1 LONG HOOS V (R)

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	FUNGCIDE	NEMACIDE	INSCTCDE(1)	INSCTCDE(2)
REP	16	16	16	16
SED	0.135	0.135	0.135	0.135

TABLE	INSCTCDE(2) FUNGCIDE	SEEDRATE* NEMACIDE	SEEDRATE* INSCTCDE(1)	NEMACIDE INSCTCDE(1)
SED	0.190	0.190	0.190	0.190

TABLE	SEEDRATE* INSCTCDE(2)	NEMACIDE INSCTCDE(2)	INSCTCDE(1) INSCTCDE(2)	SEEDRATE* FUNGCIDE
SED	0.190	0.190	0.190	0.190

TABLE	NEMACIDE FUNGCIDE	INSCTCDE(1) FUNGCIDE	INSCTCDE(1) INSCTCDE(2) FUNGCIDE	SEEDRATE* NEMACIDE INSCTCDE(1)
SED	0.190	0.190	0.269	0.269

TABLE	SEEDRATE* NEMACIDE INSCTCDE(2)	SEEDRATE* INSCTCDE(1) INSCTCDE(2)	NEMACIDE INSCTCDE(1) INSCTCDE(2)	SEEDRATE* NEMACIDE FUNGCIDE
SED	0.269	0.269	0.269	0.269

TABLE	SEEDRATE* INSCTCDE(1) FUNGCIDE	NEMACIDE INSCTCDE(1) FUNGCIDE	SEEDRATE* INSCTCDE(2) FUNGCIDE	NEMACIDE INSCTCDE(2) FUNGCIDE
SED	0.269	0.269	0.269	0.269

* SED ONLY VALID FOR COMPARING MEANS WITH THE SAME LEVEL OF SEEDRATE

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	6	0.380	9.4

GRAIN MEAN DM% 75.8

PLOT AREA HARVESTED 0.00091

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80/W/PE/1 GREAT HILL III (W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

NEMACIDE	NONE	ALDICARB	MEAN
SEEDRATE			
200	4.30	5.25	4.78
400	3.92	4.76	4.34
MEAN	4.11	5.01	4.56

INSCTCDE(1)	NONE	PERMETH	MEAN
SEEDRATE			
200	4.73	4.82	4.78
400	4.24	4.44	4.34
MEAN	4.49	4.63	4.56

INSCTCDE(1)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	4.08	4.14	4.11
ALDICARB	4.89	5.13	5.01
MEAN	4.49	4.63	4.56

INSCTCDE(2)	NONE	PERMETH	MEAN
SEEDRATE			
200	4.70	4.86	4.78
400	4.25	4.43	4.34
MEAN	4.47	4.64	4.56

INSCTCDE(2)	NONE	PERMETH	MEAN
NEMACIDE			
NONE	3.90	4.32	4.11
ALDICARB	5.04	4.97	5.01
MEAN	4.47	4.64	4.56

INSCTCDE(2)	NONE	PERMETH	MEAN
INSCTCDE(1)			
NONE	4.41	4.56	4.49
PERMETH	4.53	4.73	4.63
MEAN	4.47	4.64	4.56

FUNGCIDE	NONE	CARBENDA	MEAN
SEEDRATE			
200	4.42	5.14	4.78
400	4.21	4.47	4.34
MEAN	4.32	4.80	4.56

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80/W/PE/1 GREAT HILL III (W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

FUNGCIDE	NONE	CARBENDA	MEAN
NEMACIDE			
NONE	3.77	4.45	4.11
ALDICARB	4.86	5.15	5.01
MEAN	4.32	4.80	4.56

FUNGCIDE	NONE	CARBENDA	MEAN
INSCTCDE(1)			
NONE	4.16	4.81	4.49
PERMETH	4.47	4.80	4.63
MEAN	4.32	4.80	4.56

FUNGCIDE	NONE	CARBENDA	MEAN
INSCTCDE(2)			
NONE	4.40	4.55	4.47
PERMETH	4.23	5.05	4.64
MEAN	4.32	4.80	4.56

NEMACIDE	NONE		ALDICARB	
INSCTCDE(1)	NONE	PERMETH	NONE	PERMETH
SEEDRATE				
200	4.37	4.24	5.10	5.41
400	3.80	4.03	4.68	4.85

NEMACIDE	NONE		ALDICARB	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
SEEDRATE				
200	4.10	4.51	5.30	5.21
400	3.71	4.12	4.79	4.74

INSCTCDE(1)	NONE		PERMETH	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
SEEDRATE				
200	4.67	4.80	4.73	4.92
400	4.16	4.31	4.34	4.55

INSCTCDE(1)	NONE		PERMETH	
INSCTCDE(2)	NONE	PERMETH	NONE	PERMETH
NEMACIDE				
NONE	3.91	4.25	3.89	4.38
ALDICARB	4.92	4.86	5.17	5.09

NEMACIDE	NONE		ALDICARB	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
SEEDRATE				
200	3.77	4.83	5.07	5.44
400	3.76	4.07	4.66	4.86

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80/W/PE/1 GREAT HILL III (W)

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE(1)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
SEEDRATE				
200	4.26	5.20	4.58	5.07
400	4.06	4.41	4.36	4.52

INSCTCDE(1)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
NEMACIDE				
NONE	3.69	4.47	3.84	4.43
ALDICARB	4.63	5.14	5.10	5.16

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
SEEDRATE				
200	4.43	4.97	4.41	5.30
400	4.37	4.13	4.06	4.80

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
NEMACIDE				
NONE	3.88	3.92	3.65	4.98
ALDICARB	4.91	5.18	4.82	5.13

INSCTCDE(2)	NONE		PERMETH	
FUNGCIDE	NONE	CARBENDA	NONE	CARBENDA
INSCTCDE(1)				
NONE	4.35	4.48	3.98	5.13
PERMETH	4.45	4.61	4.49	4.98

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	FUNGCIDE	NEMACIDE	INSCTCDE(1)	INSCTCDE(2)
SED	0.106	0.106	0.106	0.106

TABLE	INSCTCDE(2) FUNGCIDE	SEEDRATE* NEMACIDE	SEEDRATE* INSCTCDE(1)	NEMACIDE INSCTCDE(1)
SED	0.150	0.150	0.150	0.150

TABLE	SEEDRATE* INSCTCDE(2)	NEMACIDE INSCTCDE(2)	INSCTCDE(1) INSCTCDE(2)	SEEDRATE* FUNGCIDE
SED	0.150	0.150	0.150	0.150

TABLE	NEMACIDE FUNGCIDE	INSCTCDE(1) FUNGCIDE	INSCTCDE(1) INSCTCDE(2) FUNGCIDE	SEEDRATE* NEMACIDE INSCTCDE(1)
SED	0.150	0.150	0.213	0.213

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80/W/PE/1 GREAT HILL III (W)

GRAIN TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SEEDRATE* NEMACIDE INSCTCDE(2)	SEEDRATE* INSCTCDE(1) INSCTCDE(2)	NEMACIDE INSCTCDE(1) INSCTCDE(2)	SEEDRATE* NEMACIDE FUNGCIDE
SED	0.213	0.213	0.213	0.213

TABLE	SEEDRATE* INSCTCDE(1) FUNGCIDE	NEMACIDE INSCTCDE(1) FUNGCIDE	SEEDRATE* INSCTCDE(2) FUNGCIDE	NEMACIDE INSCTCDE(2) FUNGCIDE
SED	0.213	0.213	0.213	0.213

* SED ONLY VALID FOR COMPARING MEANS WITH THE SAME LEVEL OF SEEDRATE

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
WP.SP	6	0.301	6.6

GRAIN MEAN DM% 82.3

PLOT AREA HARVESTED 0.00091

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80/R/PE/2

PEAS

CONTROL OF SITONA

Object: To study the effects of rates and forms of insecticides on the incidence of Sitona and on the yield of leafy peas - Lt. Knott I.

Sponsors: K.E. Fletcher, R. Bardner, D.C. Griffiths.

Design: 4 randomised blocks of 7 plots.

Whole plot dimensions: 5.69 x 8.23.

Treatments:

INSCTCDE	Insecticides:
NONE	None (duplicated)
ALD SOIL	Aldicarb at 10 kg worked into soil before sowing
PHO SOIL	Phorate at 2.24 kg worked into soil before sowing
PHO CD	Phorate at 2.24 kg combine drilled
PER1 FOL	Permethrin at 0.05 kg foliar spray
PER2 FOL	Permethrin at 0.15 kg foliar spray

NOTES: (1) Seedbed treatments were applied by hand on 5 Apr, 1980.
(2) Foliar sprays were applied in 340 l water on 7 May.

Basal applications: Manures: (0:14:28) at 380 kg. Weedkillers: Chlorthal-dimethyl (as 'Delozin S' at 6 kg) in 220 l. Desiccant: Diquat at 0.42 kg ion in 250 l.

Seed: Vedette, sown at 190 kg.

Cultivations, etc.:- Subsoiled, tines 160 cm apart and 38 cm deep: 2 Nov, 1979. Ploughed: 4 Dec. Spring-tine cultivated: 5 Mar, 1980. PK applied: 6 Mar. Spring-tine cultivated: 24 Mar. Rotary harrowed, seed sown: 5 Apr. Weedkiller applied: 17 Apr. Desiccant applied: 24 Aug. Combine harvested: 26 Aug. Previous crops: S. barley 1978 & 1979.

NOTE: Leaf notching by adult Sitona lineatus was assessed several times during the season. Soil cores were examined in June for larval populations and in August for root nodulation.

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80/R/PE/2

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

INSCTCDE	NONE	ALD SOIL	PHO SOIL	PHO CD	PER1 FOL	PER2 FOL	MEAN
	1.30	1.87	1.47	1.83	1.47	1.81	1.58

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	INSCTCDE	
SED	0.422	MIN REP
	0.365	MAX-MIN

	INSCTCDE
MAX-MIN	NONE V ANY OF THE REMAINDER
MIN REP	ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	19	0.597	37.8

GRAIN MEAN DM% 86.4

PLOT AREA HARVESTED 0.00255

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80/R/FE/1

FENUGREEK

N AND RHIZOBIUM

Object: To study the effects of inoculation with Rhizobium and times of applying nitrogen fertiliser on nodulation and yield of fenugreek (Trigonella foenum-graecum) - Long Hoos III O & E S.E.

Sponsor: D.P. Yeoman.

Design: 3 randomised blocks of 6 plots.

Whole plot dimensions: 1.52 x 2.13.

Treatments: All combinations of:

1.	INOCULUM	Inoculum applied to the seed:
	NONE	None
	RHIZOBUM	Rhizobium meliloti, strain 2012
2.	N	Nitrogen fertiliser (kg N) and times of application:
	0	None
	150 S	150 to the seedbed, on 9 April
	150 F	150 at flowering, on 18 June

NOTE: Seed was sown by hand in rows 38 cm apart, seed spaced 5 cm apart in the row.

Basal applications: Fungicide: Benomyl at 0.56 kg in 340 l applied twice. Insecticide: Permethrin at 0.15 kg in 340 l. Pirimicarb at 0.14 kg in 340 l. Desiccant: Diquat at 0.59 kg ion in 340 l.

Seed: Barbara.

Cultivations, etc.:- Ploughed: 14 Nov, 1979. Power harrowed, seed sown: 10 Apr, 1980. Permethrin applied: 4 June. Pirimicarb applied: 27 June. Benomyl applied: 16 July, 14 Aug. Diquat applied: 21 Oct. Harvested by hand: 30 Oct. Previous crops: Potatoes 1978, w. wheat 1979.

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80/R/FE/1

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	150 S	150 F	MEAN
INOCULUM				
NONE	0.76	1.73	1.65	1.38
RHIZOBUM	1.02	1.87	1.45	1.45
MEAN	0.89	1.80	1.55	1.41

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	INOCULUM	N	INOCULUM N
SED	0.121	0.148	0.210

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	10	0.257	18.2

GRAIN MEAN DM% 89.8

PLOT AREA HARVESTED 0.00012

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80/W/PH/1

PHASEOLUS

RHIZOBIUM INOCULATION STUDY

Object: To study the effects of Rhizobium phaseoli inoculation and nitrogen fertiliser on the yields and nitrogen uptakes of two varieties of Phaseolus vulgaris - Gt. Hill III.

Sponsor: J.M. Day.

Design: 4 randomised blocks of 4 plots split into 5 plus 2 extra plots.

Whole plot dimensions: 1.83 x 22.9.

Treatments: All combinations of:-

Whole plots

1. VARIETY	Varieties:
SEAFARER	Seafarer, harvested as grain
CASCADE	Cascade, harvested as green pods
2. INOCULUM	Inoculum:
NONE	None
RHIZOB	Rhizobium phaseoli - a mixture of strains, R3644, R3622 and 963A

Sub plots

3. N	Nitrogen fertiliser (kg N) as 'Nitro-Chalk':
0	None
30	30 to seedbed
60	60 to seedbed
120	120 to seedbed
120+60	120 to seedbed plus 60 at flowering

plus two extra plots:

EXTRA	
SEAF ISN	Seafarer, inoculated R. phaseoli and given slow release N
CASC ISN	Cascade, inoculated R. phaseoli and given slow release N

NOTES (1) The slow release N was a mixture of glucose and ammonium sulphate labelled with 15 N in the ratio 10:1 and applied at 1 kg N.
(2) In each block there was one plot divided into sub plots for crops (maize, fenugreek and soya bean) and nitrogen fertiliser applied at the same rates given to Phaseolus, to assess N uptake by non-nodulating crops during the season. Yields from these crops are not presented.
(3) One of the blocks was abandoned because of many grass weeds.
(4) Yields were not recorded for VARIETY CASCADE and EXTRA SEAF ISN.

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80/W/PH/1

Basal applications:- Manures: Magnesian limestone at 7.5 t. (0:14:28) at 340 kg. Weedkillers: Carbetamide (as 'Carbetamex' at 3.1 kg) in 280 l. Bentazone (as 'Basagran' at 2.9 l) with spray additive (as 'Actipron' at 2.0 l) in 280 l.

Seed: Sown at 250,000 seeds per hectare.

Cultivations, etc.:-
Magnesian limestone applied: 29 Sept, 1979. Ploughed: 20 Oct. Spring-tine cultivated, field beans sown: 23-24 Oct. 'Carbetamex' applied: 2 Nov. Field beans failed, ploughed in: 12 Feb, 1980. Heavy spring-tine cultivated, PK applied, rotary cultivated: 11 Apr. Slow release nitrogen treatment applied: 29 Apr. Spring-tine cultivated, seed sown: 19 May. 'Nitro-Chalk' applied: 23 May and 18 July. 'Basagran' with 'Actipron' applied to Phaseolus only: 3 July. Harvested by hand: 17 Sept. Previous crops: Potatoes 1978, w. wheat 1979.

NOTES: Plant samples were taken at weekly intervals for measurements of dry weight, nitrogen uptake and nitrogenase content.

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

N	0	30	60	120	120+60	MEAN
INOCULUM						
NONE	0.72	0.99	1.13	1.59	1.69	1.22
RHIZOB	1.48	1.65	1.96	1.91	1.90	1.78
MEAN	1.10	1.32	1.54	1.75	1.80	1.50

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	N	INOCULUM* N
SED	0.106	0.150

* WITHIN THE SAME LEVEL OF INOCULUM ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	16	0.184	12.3

PLOT AREA HARVESTED 0.00167

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80/W/PH/2

PHASEOLUS

RHIZOBIUM STRAINS

Object: To study the effects of a range of strains of Rhizobium phaseoli on nodulation and yield of Phaseolus vulgaris - Gt. Hill III.

Sponsor: J.M. Day.

Design: 4 randomised blocks of 20 plots.

Whole plot dimensions: 1.90 x 3.96.

Treatments:

RHIZOB N	Rhizobium strains and nitrogen fertiliser:
R0 N0	No inoculum, no nitrogen (duplicated)
R0 N40	" " , 40 kg N to seedbed
R0 N80	" " , 80 " " " "
R0 N120	" " , 120 " " " "
R1 N0	Rhizobium strain CIAT 127, no nitrogen
R2 N0	" " CIAT 166, " "
R3 N0	" " CIAT 407, " "
R4 N0	" " CIAT 255, " "
R5 N0	" " CIAT 161, " "
R6 N0	" " CIAT 727, " "
R7 N0	" " CIAT 57, " "
R8 N0	" " CIAT 390, " "
R9 N0	" " CIAT 904, " "
R10 N0	" " CIAT 952, " "
R11 N0	" " RC 3644, " "
R12 N0	" " RC 3622, " "
R13 N0	" " RC 963A, " "
R14 N0	" " RC 3608, " "
RA N0	All 14 Rhizobium strains mixed, no nitrogen

Basal applications: Manures: Magnesian limestone at 7.5 t (0:14:28) at 340 kg. Weedkillers: Carbetamide (as 'Carbetamex' at 3.1 kg) in 280 l. Bentazone (as 'Basagran' at 2.9 l) with spray additive (as 'Actipron' at 2.0 l) in 280 l.

Seed: Longbow, sown at 250,000 seeds per hectare.

Cultivations, etc.:- Magnesian limestone applied: 29 Sept, 1979. Ploughed: 20 Oct. Spring-tine cultivated, field bean seed sown: 23-24 Oct. 'Carbetamex' applied: 2 Nov. Field beans ploughed in: 12 Feb, 1980. Heavy spring-tine cultivated, PK applied, rotary cultivated: 11 Apr. Spring-tine cultivated: 19 May. Ridged up: 20 May. Seed sown by hand: 21 May. 'Basagran' with 'Actipron' applied: 27 June. Harvested by hand: 30 Sept. Previous crops: Potatoes 1978, w. wheat 1979.

NOTE: One block and one plot in another block with treatment R0 N0 were abandoned because of many grass weeds. An estimated value for the missing plot was used in the analysis.

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80/W/PH/2

GRAIN TONNES/HECTARE

***** TABLES OF MEANS *****

RHIZOB N	
RO NO	1.11
RO N40	1.42
RO N80	1.92
RO N120	1.87
R1 NO	2.05
R2 NO	2.29
R3 NO	2.28
R4 NO	1.48
R5 NO	1.86
R6 NO	2.00
R7 NO	1.19
R8 NO	1.46
R9 NO	2.49
R10 NO	2.22
R11 NO	2.13
R12 NO	1.79
R13 NO	1.74
R14 NO	1.86
RA NO	1.75
MEAN	1.80

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	RHIZOB N	
SED	0.307	MIN REP
	0.266	MAX-MIN

RHIZOB N
MAX-MIN RO NO V ANY OF THE REMAINDER
MIN REP ANY OF THE REMAINDER

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	38	0.376	20.9

PLOT AREA HARVESTED 0.00167

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80/R/MA/1

FORAGE MAIZE

RATES & TIMES OF N

Object: To study the effects of a range of nitrogen fertiliser rates, applied before sowing or to the seedbed, on the yields and nitrogen uptakes of forage maize - Long Hoos V 6.

Sponsor: A.J. Barnard.

Design: 2 randomised blocks of 32 plots.

Whole plot dimensions: 2.13 x 3.66.

Treatments: All combinations of:-

1. EARLY N — Rates of nitrogen fertiliser (kg N) applied on 14 Apr, 1980:

   0
   60
   120
   180

2. SDBED N — Rates of nitrogen fertiliser (kg N) applied on 13 May:

   0
   30
   60
   90
   120
   150
   180
   210

Basal applications: Manures: Chalk at 2.9 t. (0:14:28) at 870 kg. Weedkillers: Atrazine at 1.7 kg in 340 l. Insecticide: Dimethoate at 0.67 kg in 340 l.

Seed: Fronica, sown at 100,000 seeds per hectare.

Cultivations, etc.:- Chalk applied: 18 Oct, 1979. Ploughed: 1 Nov. PK applied: 21 Mar, 1980. Spring-tine cultivated: 9 May. Power harrowed, seed sown: 12 May. Weedkiller applied: 19 May. Insecticide applied: 5 June. Hand harvested: 8 Oct. Previous crops: Potatoes 1978, s. wheat 1979.

NOTE: Plant population counts were made in July and the N content of the harvest produce was measured.

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80/R/MA/1

FORAGE MAIZE DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

SDBED N / EARLY N	0	30	60	90	120	150	180	210	MEAN
0	6.00	8.91	10.07	11.95	11.80	13.10	13.10	15.12	11.26
60	11.07	11.93	12.95	11.76	12.96	12.87	12.95	12.49	12.37
120	12.79	12.66	12.52	12.57	11.30	12.55	12.50	13.43	12.54
180	12.45	11.39	13.70	13.05	11.99	12.27	11.86	12.54	12.41
MEAN	10.58	11.22	12.31	12.33	12.01	12.70	12.60	13.39	12.14

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EARLY N	SDBED N	EARLY N SDBED N
SED	0.427	0.604	1.208

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	31	1.208	9.9

GRAIN MEAN DM% 21.3

PLOT AREA HARVESTED 0.00039

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80/W/MA/1

MAIZE

EFFECTS OF HETERODERA AVENAE

Object: To study the effects of four rates of aldicarb on the incidence of cereal cyst nematode, Heterodera avenae, and on the yield of two varieties of forage maize - Woburn Butt Close.

Sponsor: T.D. Williams.

Design: 4 randomised blocks of 4 plots split into 4.

Whole plot dimensions: 2.13 x 21.0.

Treatments: All combinations of:-

Whole plots

1. VARIETY — Varieties:

   AURELIA
   FRONICA

2. N — Nitrogen fertiliser (kg N):

   50
   100

Sub plots

3. ALDICARB — Aldicarb (kg):

   0.0
   1.7
   3.3
   5.0

Basal applications:- Manures: (0:14:28) at 640 kg. Weedkiller: Atrazine at 1.1 l in 280 l. Insecticide: Chlorfenvinphos at 2.2 kg.

Seed: Sown at 103,300 seed per hectare.

Cultivations, etc.:- Ploughed: 5 Nov, 1979. Heavy spring-tine cultivated: 28 Feb, 1980. Spring-tine cultivated: 25 Apr. Aldicarb applied, rotary cultivated: 28 Apr. N and PK applied, rotary cultivated: 29 Apr. Weedkiller applied, harrowed, seed sown: 30 Apr. Insecticide applied: 28 May. Hand harvested: 6 Oct. Previous crops: S. oats 1978, s. barley 1979.

NOTE: Soil samples were taken before treatments were applied and after harvest for counts of cysts and larvae of cereal cyst nematode.

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80/W/MA/1

FORAGE MAIZE DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N	50	100	MEAN
VARIETY			
AURELIA	9.48	11.82	10.65
FRONICA	10.35	13.34	11.85
MEAN	9.92	12.58	11.25

ALDICARB	0.0	1.7	3.3	5.0	MEAN
VARIETY					
AURELIA	9.14	11.31	10.79	11.37	10.65
FRONICA	10.14	11.74	12.61	12.90	11.85
MEAN	9.64	11.52	11.70	12.13	11.25

ALDICARB	0.0	1.7	3.3	5.0	MEAN
N					
50	8.33	9.97	10.08	11.30	9.92
100	10.96	13.08	13.32	12.97	12.58
MEAN	9.64	11.52	11.70	12.13	11.25

	ALDICARB	0.0	1.7	3.3	5.0
VARIETY	N				
AURELIA	50	7.91	10.13	9.30	10.61
	100	10.38	12.50	12.29	12.13
FRONICA	50	8.75	9.81	10.87	11.99
	100	11.53	13.66	14.36	13.80

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY	N	ALDICARB	VARIETY N
SED	0.770	0.770	0.486	1.089

TABLE	VARIETY ALDICARB	N ALDICARB	VARIETY N ALDICARB
SED	0.973	0.973	1.377
EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:			
VARIETY	0.687		
N		0.687	
VARIETY.N			0.972

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	9	1.541	13.7
BLOCK.WP.SP	36	1.374	12.2

GRAIN MEAN DM% 25.0 SUB PLOT AREA HARVESTED 0.00049

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80/R/P/4

POTATOES

EFFECTS OF SPACING AND LODGING

Object: To study the effects of spacing and artificial lodging on radiation interception, crop growth-rates and yield - Sawyers II.

Sponsor: D.W. Wood.

Design: 2 randomised blocks of 2 whole plots split into 6.

Whole plot dimensions: 4.27 x 15.2.

Treatments: All combinations of:-

Whole plots

1. SEEDSIZE	Size range of seed tubers:	
	SMALL	20 to 40 g
	LARGE	70 to 90 g

Sub plots

2. SPACING	Spacing within ridges 71 cm apart:	
	25 CM	
	50 CM	
3. LODGING	Artificial lodging:	
	NONE	None
	EARLY	Early 9 July
	LATE	Later 19 Aug

Basal applications: Manures: Chalk at 7.5 t. (0:20:20) at 1260 kg. Epsom salts at 145 kg mixed with kieserite at 145 kg. FYM at 25 t. (13:13:20) at 1510 kg. Weedkiller: Linuron at 1.2 kg in 250 l. Fungicides: Mancozeb at 1.3 kg in 250 l applied six times, with insecticide on the third and fourth occasions. Insecticide: Pirimicarb at 0.14 kg.

Seed: Pentland Crown.

Cultivations, etc.:- Heavy spring-tine cultivated: 17 Sept, 1979. Chalk applied: 9 Oct. Subsoiled with tines 160 cm apart and 40 cm deep: 1 Nov. PK applied: 13 Nov. FYM applied: 21 Dec. Epsom salts and kieserite applied: 31 Dec. Ploughed: 8 Jan, 1980. Heavy spring-tine cultivated: 14 Apr. NPK applied, spike rotary cultivated, ridged: 15 Apr. Hand planted, ridges split back: 16 Apr. Grubbed: 24 Apr. Rotary ridged: 28 Apr. Weedkiller applied: 18 May. Fungicide applied: 18 June, 30 June, 11 July, 24 July, 5 Aug, 18 Aug. Insecticide applied: 11 July, 24 July. Harvested by hand: 10 Oct. Previous crops: W. oats 1978, w. wheat 1979.

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80/R/P/4

NOTE: Seed sprout characteristics were assessed at planting. Emergence counts were made daily in late May. Full growth analyses were done at intervals of 21 days between early July and late September. Radiation interception was measured at intervals of 10 days between early June and late September.

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

SPACING	25 CM	50 CM	MEAN
SEEDSIZE			
SMALL	79.6	75.8	77.7
LARGE	80.6	76.5	78.6
MEAN	80.1	76.1	78.1

LODGING	NONE	EARLY	LATE	MEAN
SEEDSIZE				
SMALL	78.1	76.3	78.7	77.7
LARGE	80.2	77.9	77.6	78.6
MEAN	79.2	77.1	78.1	78.1

LODGING	NONE	EARLY	LATE	MEAN
SPACING				
25 CM	82.6	78.2	79.5	80.1
50 CM	75.7	76.0	76.7	76.1
MEAN	79.2	77.1	78.1	78.1

SPACING	25 CM			50 CM		
LODGING	NONE	EARLY	LATE	NONE	EARLY	LATE
SEEDSIZE						
SMALL	80.9	77.1	80.9	75.3	75.5	76.5
LARGE	84.3	79.4	78.2	76.2	76.4	77.0

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80/R/P/4

TOTAL TUBERS TONNES/HECTARE

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	SPACING	LODGING	SEEDSIZE* SPACING
SED	1.61	1.97	2.28

TABLE	SEEDSIZE* LODGING	SPACING LODGING	SEEDSIZE* SPACING LODGING
SED	2.79	2.79	3.95

EXCEPT WHEN COMPARING MEANS WITH SAME LEVEL(S) OF:

* WITHIN THE SAME LEVEL OF SEEDSIZE ONLY

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP.SP	10	3.95	5.1

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

***** TABLES OF MEANS *****

SPACING	25 CM	50 CM	MEAN
SEEDSIZE			
SMALL	87.5	92.2	89.9
LARGE	87.1	91.5	89.3
MEAN	87.3	91.9	89.6

LODGING	NONE	EARLY	LATE	MEAN
SEEDSIZE				
SMALL	90.2	88.4	91.0	89.9
LARGE	90.8	89.6	87.6	89.3
MEAN	90.5	89.0	89.3	89.6

LODGING	NONE	EARLY	LATE	MEAN
SPACING				
25 CM	89.7	87.7	84.6	87.3
50 CM	91.3	90.3	94.0	91.9
MEAN	90.5	89.0	89.3	89.6

SPACING	25 CM			50 CM		
LODGING	NONE	EARLY	LATE	NONE	EARLY	LATE
SEEDSIZE						
SMALL	90.1	85.3	87.1	90.4	91.5	94.9
LARGE	89.3	90.1	82.1	92.3	89.1	93.1

SUB PLOT AREA HARVESTED 0.00116

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80/W/P/5

POTATOES

VARIETIES AND POTATO CYST NEMATODE

Object: To measure the yields of potato varieties, resistant and susceptible to potato cyst-nematode, on infested land treated with and without oxamyl and to study effects on nematode populations - Woburn, Horsepool.

Sponsor: A.G. Whitehead.

Design: 3 randomised blocks of 16 plots.

Whole plot dimensions: 2.84 x 6.09.

Treatments: All combinations of:-

1. VARIETY — Varieties:

A BANNER	Arran Banner
CARA	Cara
CROFT	Croft
DESIREE	Desiree
M PIPER	Maris Piper
P CROWN	Pentland Crown
P DELL	Pentland Dell
RECORD	Record

2 OXAMYL — Oxamyl to seedbed (kg):

0.0
5.6

Basal applications:- Manures: (13:13:20) at 1880 kg. Weedkiller: Linuron at 1.1 l in 280 l. Fungicide: Mancozeb at 1.3 kg in 300 l applied five times, with insecticide on the third, fourth and fifth occasions. Insecticide: Pirimicarb at 0.14 kg. Haulm desiccant: Undiluted BOV at 170 l.

Cultivations, etc.:- Heavy spring-tine cultivated: 20 Oct, 1979. Spring-tine cultivated: 22 Oct. NPK applied: 12 Apr, 1980. Heavy spring-tine cultivated: 14 Apr. Oxamyl applied, rotary cultivated, potatoes planted: 1 May. Weedkiller applied: 16 May. Fungicide applied: 18 June, 3 July, 22 July, 10 Aug, 22 Aug. Insecticide applied: 22 July, 10 Aug, 22 Aug. Haulm desiccant applied: 24 Sept. Lifted: 30 Sept. Previous crops: W. oats 1978, potatoes 1979.

NOTES: (1) Soil samples were taken before applying treatments and after harvest for counts of cysts, eggs, and larvae of Globodera rostochiensis.
(2) The treatment combinations of OXAMYL 0.0 with VARIETY A BANNER, CROFT, DESIREE, P CROWN, P DELL, RECORD gave very poor yields. These combinations were omitted from the analysis presented and standard errors presented do not apply to them.

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80/W/P/5

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

OXAMYL	0.0	5.6
VARIETY		
A BANNER	0.3	53.0
CARA	37.1	63.4
CROFT	3.2	65.7
DESIREE	1.3	52.1
M PIPER	24.8	63.7
P CROWN	2.5	65.7
P DELL	1.0	52.6
RECORD	1.1	61.4

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	VARIETY* OXAMYL
SED	5.10

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE*	CV%
BLOCK.WP	18	6.25	11.6

* CALCULATED ONLY FROM PLOTS WITH VARIETIES
CARA AND M PIPER WITH OXAMYL 0.0 AND
ALL VARIETIES WITH OXAMYL 5.6

PERCENTAGE WARE 3.81 CM (1.5 INCH) RIDDLE TONNES/HECTARE

***** TABLES OF MEANS *****

OXAMYL	0.0	5.6
VARIETY		
A BANNER	0.0	97.3
CARA	96.5	97.8
CROFT	52.4	95.9
DESIREE	0.0	93.4
M PIPER	94.1	94.4
P CROWN	34.8	96.4
P DELL	9.5	96.6
RECORD	7.0	96.0

PLOT AREA HARVESTED 0.00087

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80/R/P/6

POTATOES

SEED TREATMENT AND TUBER SIZE

Object: To study the effects of seed treatment with thiabendazole and times of boxing on stem numbers, tuber numbers and size and on the yield of potatoes - Sawyers II.

Sponsors: G.A. Hide, G.R. Cayley.

Design: 4 randomised blocks of 11 plots.

Whole plot dimensions: 2.84 x 9.53.

Treatments: All combinations of:-

1. FUNGCIDE — Fungicide at lifting in 1979:

NONE	None
THIABEND	Thiabendazole at 10 g per tonne of seed

2. BOX TIME — Times of boxing:

NONE	Seed not boxed
LIFTING	At lifting on 14 September 1979
DECEMBER	17 December
APRIL	8 April

plus three extra plots:

EXTRA

TD BD	Seed treated with thiabendazole at boxing in December
TA BA	" " " " " " April
TP 0	" " " " at planting. Not boxed

NOTE: Thiabendazole was applied by dipping tubers in a 0.1% solution for five minutes.

Basal applications: Manures: Chalk at 7.5 t. (0:20:20) at 1260 kg. FYM at 25 t. Epsom salts at 145 kg mixed with kieserite at 145 kg. (13:13:20) at 1510 kg. Weedkillers: Linuron at 1.1 kg in 250 l. Fungicide: Mancozeb at 1.3 kg in 250 l applied six times, with insecticide on the third and fourth occasions. Insecticide: Pirimicarb at 0.14 kg. Desiccant: BOV at 170 l.

Seed: King Edward.

Cultivations, etc.:- Heavy spring-tine cultivated: 17 Sept, 1979. Chalk applied: 9 Oct. Subsoiled with tines 160 cm apart and 40 cm deep: 1 Nov. PK applied: 13 Nov. FYM applied: 21 Dec. Epsom salts and kieserite applied: 31 Dec. Ploughed: 8 Jan, 1980. Heavy spring-tine cultivated: 14 Apr. NPK applied, spike rotary cultivated, ridged: 15 Apr. Hand planted, ridges split back: 16 Apr. Grubbed: 24 Apr. Rotary ridged: 28 Apr. Weedkillers applied: 18 May. Fungicide applied: 18 June, 30 June, 11 July, 24 July, 5 Aug, 18 Aug. Insecticide applied: 11 July, 24 July. Desiccant applied: 19 Sept. Tops mechanically destroyed: 1 Oct. Lifted: 3 Oct.

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Previous crops: W. oats 1978, w. wheat 1979.

NOTE: Emergence counts were made in late May, plant and stem counts in late September.

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

BOX TIME	NONE	LIFTING	DECEMBER	APRIL	MEAN
FUNGCIDE					
NONE	52.1	60.8	58.6	58.7	57.5
THIABEND	53.5	57.7	58.3	60.6	57.5
MEAN	52.8	59.2	58.4	59.6	57.5

EXTRA	TD BD	TA BA	TP 0	MEAN
	55.8	56.1	52.3	54.7

GRAND MEAN 56.8

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	FUNGCIDE	BOX TIME	FUNGCIDE BOX TIME & EXTRA
SED	2.46	1.23	1.74	2.46

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	30	3.48	6.1

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

***** TABLES OF MEANS *****

BOX TIME	NONE	LIFTING	DECEMBER	APRIL	MEAN
FUNGCIDE					
NONE	85.8	85.1	84.3	84.7	85.0
THIABEND	84.0	85.3	81.1	82.5	83.2
MEAN	84.9	85.2	82.7	83.6	84.1

EXTRA	TD BD	TA BA	TP 0	MEAN
	84.7	83.9	86.4	85.0

GRAND MEAN 84.3

PLOT AREA HARVESTED 0.00135

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80/R/P/7

POTATOES

VARIETIES AND TIMES OF APPLYING FUNGICIDES

Object: To study the effects of two times of applying two fungicides to seed tubers of three varieties on the yield and infection of progeny tubers and on disease incidence on the stored produce - Sawyers II.

Sponsors: G.A. Hide, G.R. Cayley.

Design: 4 randomised blocks of 15 plots.

Whole plot dimensions: 1.42 x 9.53.

Treatments: All combinations of:-

1. FUNGCIDE — Fungicides and times of application:

NONE	None
IMAZ L	Imazalil at lifting in 1979
IMAZ L+B	Imazalil at lifting in 1979 and at boxing
THIA L	Thiabendazole at lifting in 1979
THIA L+B	Thiabendazole at lifting in 1979 and at boxing

2. VARIETY — Varieties:

CROWN	Pentland Crown
DESIREE	Desiree
EDWARD	King Edward

NOTES: (1) Lifting treatments were applied on the following dates: Pentland Crown 22 Oct, 1979, Desiree 12 Sept, King Edward 13 Sept. Boxing treatments were all done on 13 Feb 1980.
(2) Fungicides were applied at 18 g per tonne of seed by dipping tubers in a 0.2% solution for five minutes.

Basal applications: Manures: Chalk at 7.5 t. (0:20:20) at 1260 kg. FYM at 25 t. Epsom salts at 145 kg mixed with kieserite at 145 kg. (13:13:20) at 1510 kg. Weedkillers: Linuron at 1.1 kg in 250 l. Fungicide: Mancozeb at 1.3 kg in 250 l applied six times, with insecticide on the third and fourth occasions. Insecticide: Pirimicarb at 0.14 kg. Desiccant: BOV at 170 l.

Cultivations, etc.:- Heavy spring-tine cultivated: 17 Sept, 1979. Chalk applied: 9 Oct. Subsoiled with tines 160 cm apart and 40 cm deep: 1 Nov. PK applied: 13 Nov. FYM applied 21 Dec. Epsom salts and kieserite applied: 31 Dec. Ploughed: 8 Jan, 1980. Heavy spring-tine cultivated: 14 Apr. NPK applied, spike rotary cultivated, ridged: 15 Apr. Hand planted, ridges split back: 16 Apr. Grubbed: 24 Apr. Rotary ridged: 28 Apr. Weedkillers applied: 18 May. Fungicide applied: 18 June, 30 June, 11 July, 24 July, 5 Aug, 18 Aug. Insecticide applied: 11 July, 24 July. Desiccant applied: 19 Sept. Lifted: 3 Oct. Previous crops: W. oats 1978, w. wheat 1979.

NOTE: Emergence counts were made in late May, and plant and stem counts before harvest. Disease assessments were made on harvested produce.

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80/R/P/7

TOTAL TUBERS TONNES/HECTARE

***** TABLES OF MEANS *****

VARIETY FUNGCIDE	CROWN	DESIREE	EDWARD	MEAN
NONE	70.8	62.8	59.3	64.3
IMAZ L	69.4	59.4	60.2	63.0
IMAZ L+B	60.0	61.9	54.4	58.8
THIA L	69.3	59.6	59.7	62.9
THIA L+B	72.2	63.0	58.6	64.6
MEAN	68.3	61.3	58.4	62.7

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	FUNGCIDE	VARIETY	FUNGCIDE VARIETY
SED	1.62	1.25	2.80

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	42	3.96	6.3

PERCENTAGE WARE 4.44CM (1.75 INCH) RIDDLE

***** TABLES OF MEANS *****

VARIETY FUNGCIDE	CROWN	DESIREE	EDWARD	MEAN
NONE	89.0	90.3	84.4	87.9
IMAZ L	89.7	92.3	81.1	87.7
IMAZ L+B	89.4	90.7	82.3	87.5
THIA L	87.0	88.6	81.0	85.5
THIA L+B	87.7	90.7	80.8	86.4
MEAN	88.6	90.5	81.9	87.0

PLOT AREA HARVESTED 0.00135

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80/R/G/1

GRASS

LIQUID FERTILISER AND NITRIFICATION INHIBITORS

Object: To study the effects of adding nitrification inhibitors to liquid fertilisers on the yield and nitrogen uptake of grass cut for silage - White Horse II.

Sponsors: F.V. Widdowson, A. Penny, G.A. Rodgers.

Design: 3 randomised blocks of 20 plots.

Whole plot dimensions: 2.44 x 12.2.

Treatments: All combinations of:-

1. N TIME — Times of injecting aqueous urea and nitrification inhibitors:

22 NOV	22 November, 1979
24 JAN	24 January, 1980
24 MAR	24 March, 1980

2. N INHIB — Nitrification inhibitors, added to aqueous urea supplying 375 kg N:

U3 0	None
U3 NI	Nitrapyrin at 1.5 kg
U3 ST2	Sodium trithiocarbonate (rate equivalent to 10 kg carbon disulphide)
U3 ST1+P	Sodium trithiocarbonate (rate equivalent to 5 kg carbon disulphide) plus potassium ethyl xanthate at 5 kg
U3 ST2+P	Sodium trithiocarbonate (rate equivalent to 10 kg carbon disulphide) plus potassium ethyl xanthate at 5 kg

plus five extra treatments

EXTRA — 'Nitro-Chalk' dressings (kg N):

0	None
NC2 D	250 divided equally between 3 application dates - 10 Mar, 1980, 2 June, 28 July
NC3 D	375 divided equally between 3 application dates - 10 Mar, 1980, 2 June, 28 July
NC4 D	500 divided equally between 3 application dates - 10 Mar, 1980, 2 June, 28 July
NC3 S	375 as a single application on 10 Mar

NOTE: For the combination N TIME 24 Mar and N INHIB U3 ST1+P, sodium trithiocarbonate was replaced by dicyandiamide at 15 kg.

Basal applications: Manures: (0:14:28) at 500 kg.

Cultivations, etc.:- Topped: 21 Nov, 1979. Cut: 28 May 1980, 23 July, 23 Oct. Previous crops: W. oats 1978, grass 1979.

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NOTE: Urea concentration in soil was measured within 14 days of injection. Nitrate and ammonium in soil were measured at 21 day intervals until early May. Nitrate in herbage was measured after the first cut.

1ST CUT (28/5/80) DRY MATTER TONNES/HECTARE

***** TABLES OF MEANS *****

N INHIB N TIME	U3 0	U3 NI	U3 ST2	U3 ST1+P	U3 ST2+P	MEAN
22 NOV	5.27	5.85	5.78	5.73	5.89	5.71
24 JAN	5.19	5.46	5.39	5.32	5.30	5.33
24 MAR	4.23	4.17	4.26	4.11*	4.37	4.23
MEAN	4.90	5.16	5.15	5.06*	5.19	5.09

EXTRA	0	NC2 D	NC3 D	NC4 D	NC3 S	MEAN
	0.70	3.42	4.45	4.04	5.31	3.58

GRAND MEAN 4.71

***** STANDARD ERRORS OF DIFFERENCES OF MEANS *****

TABLE	EXTRA	N TIME	N INHIB	N TIME N INHIB
SED	0.172	0.077	0.099	0.172

***** STRATUM STANDARD ERRORS AND COEFFICIENTS OF VARIATION *****

STRATUM	DF	SE	CV%
BLOCK.WP	38	0.210	4.5

* SEE NOTE ON FIRST PAGE

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